AMERICAN
DYESTUFF REPORTER

VOLUME XXII | MAY 22, 1933 | NUMBER 11

Technical Terms Not Subject to Monopoly

By WALDON FAWCETT

ONE of the oldest and most highly controversial questions of American business life propounds, in various aspects, the riddle of where rest the boundary lines of technical terms. Lately, thanks to sharpening competitive conditions, the issue has become all the more acute. And, as though timed to meet the new pressure, Federal tribunals charged with jurisdiction over the vocabulary of specification and identification, have become particularly emphatic in expression of the judicial attitude. Notably has the U. S. Court of Patent Appeals—the so-called "supreme court of trade marks"—placed new milestones by its pronouncements which, indirectly, prescribe the administrative policy of the U. S. Patent Office.

In all the various test cases which have been following one another, building up, the while, a structure of precedent and tradition, the fundamental conundrum is that of the separation of generic terms, and broadly descriptive technical terms, from the arbitrary, more or less fanciful and distinctive terms. The reason for the solicitude as to classification is that the unique or truly individualistic technical term may be reserved to the sole use of the prior user through registration at Washington as a trade mark. Whereas, the technical name, phrase or combination of words which is common currency in the vocabulary of science or industry must be preserved to the free use of all parties who may desire to employ it in designation or specification.

What has complicated, more recently, an always knotty problem is the change of status of many technical terms. There are a few instances—comparatively few, be it confessed, where a technical characterization which started its career as a descriptive adjunct, has come, from prolonged, exclusive association with a given product or line, to indicate to trade and public the output of a particular manufactory or a specific source of production. In these circumstances it is said that the word or name so isolated has acquired "secondary meaning." No period of probation has been prescribed for a term thus withdrawn from the public domain. But when the subject of sanctioning legislation has been discussed in Congressional Committee the prevailing suggestion has been that five years' substantially exclusive use should be sufficient for a presumption of exclusive title.

Much more numerous than the cases of post-limitation of erstwhile technical terms are the instances in which terms that originated as technical nicknames of limited application have been appropriated by the public or sections of the public for the everyday purposes of specification. Finally, and latterly most difficult of appraisal, are the border line terms which are coined for private purposes by such expedients as the abbreviation of familiar technical terms, misspelling with the purpose of partial disguise, or the formation of compound words from standard technical terms. It is to this challenging category that the Federal name-arbiters have recently addressed themselves most deliberately.

The crux of the hardships of analysis lies in the circumstance that, under the rules and regulations governing the Federal registration of trade marks, or trade mark names, the "merely suggestive" word or term is subject to monopoly by its proven pioneer user whereas the downright "descriptive" term is not so possessable by any individual interest even though that interest has sought, by advertising or catalog listing to impute a special, intimate significance. Even in the case of ordinary or commonplace descriptive words, the administration of the prohibition of registration has been difficult. Logically, it has become doubly complicated where the terms which must be assayed for descriptiveness are technical in character or function. Expert testimony has come to play a considerable part in all contests predicated upon technical status.

In looking for an explanation of the firmer note in judicial denial of the withdrawal of technical terms from the common vocabulary, the utmost significance must be ascribed to the basic policies promulgated by the U. S. Court of Patent Appeals—a comparatively new institution. This tribunal has, by direction of Congress, succeeded the Court of Appeals of the District of Columbia as the mentor of the executive branch. With added prestige attaching, the new Court is enabled to speak with a

note of finality not present in the past, save on those rare occasions when the Supreme Court of the United States consented to review a test case that came up from the Patent Office. Now, with the new Court of Patent Appeals inclined, as a matter of principle, to grant the broadest possible protection to industrial property, the sanctity of technical terms is confirmed. That this conservatism has had its effect is indicated by the lessened number of attempts to isolate, for personal or corporate use, terms expressive of processes, formulae, commodity ingredients, composition, etc.

Perhaps the policy of the new guardian of technical terms may be best depicted by means of representative example. We will take for this illustrative purpose the recent effort of an applicant to fence off by registration the term "Copperweld." The example is apt because here was an instance in which the registerability of the coveted term rested solely upon the determination whether the notation was descriptive, or, as the claimant asserted, "only suggestive." In behalf of the latter premise it was argued that a technical term is not descriptive unless it calls up an immediate mental picture of the goods or the method of fabrication. If mental processes are required to connect a commodity or process with a mark, the mark, by this logic, must be accounted merely suggestive.

Another test which it is sought to apply to distinguish special and intimate technical terms from general terms is that of intimacy of association. By this prescription, a general technical term must approximate closely the physical characteristics of the material designated. If the notation is "remote" from the physical characteristics an alibi is claimed. Persons who have sought registration for terms suspected of broadly open technical status have always been wont to seek vindication by showing, if it be possible, that a term in contention does not "trench upon common speech" descriptive of the goods. If it can be shown that no one uses a challenged term in a descriptive sense its standing as a vehicle of specification is seriously impugned even though the term has a descriptive ring in the ears of the jurist and layman.

What the Court of Patent Appeals did pointedly in the "Copperweld" case, which is so eloquent as a precedent, was to rule that the circumstance that a term is a "coined word," so-called, does not absolve it from responsibility or possible responsibility as a technical term. In the past, special privilege has been claimed for the "invented" word, however strong its technical flavor. This assumption of immunity has rested upon a number of acquittals. For example, the case of "Citrofume." In the course of a dispute between the California Cyanide Company and American Cyanamid Company, a high Federal court had declared that this word had no common meaning—had, indeed, no meaning whatever, because it did not exist—until applied to the chemical product defined.

Brushing aside such traditions, the Patent Appeals Court has now indicated that where a technical term of common and almost universal use is preceded by a qualifying word (say a noun used in an adjective sense) it does more than merely suggest the nature or character of the product on which it is used. Incidentally, the recent developments show that Federal arbiters, in denying exclusive franchises, will not distinguish between terms which visualize a physical product and terms which lay claim to quality or service for a product by proclaiming the process or practice of manufacture or operation. In line with this veto upon indirection, was the refusal of a Federal court to approve use of the term "Metered Mail" as a trade mark for a machine for canceling stamps.

Lowell Textile Alumni Reunion

The 34th annual reunion of the Lowell Textile Institute Alumni Association was held in Lowell, Mass., on Saturday, May 20th. The business meeting was held at 10:30 A. M. with Arnold J. Midwood, '05, president, in the chair. Reports of officers were heard and the election of officers took place. The Technical Hour was held at 1:45 P. M. and the general chairman was Charles H. Forsaith, '20. Sub-chairmen were as follows: Chemistry and dyeing—Prof. Charles Howarth, '17; Engineering—Alexander Campbell, '23; Cotton Manufacturing—Richard Rawlinson, '31, and Wool Manufacturing—Phillip Warren, '23. At 3:15 there was a baseball game with Springfield College. The usual banquet in the evening was omitted this year.

Summer Courses for Mill Men

The North Carolina State College Summer School, which opens June 19 and runs for six weeks, will offer courses in weaving, designing, fabric analysis and cotton classing which should prove of interest to many men now working in textile plants that desire to equip themselves for better positions.

Dr. Thomas Nelson, Dean, and T. R. Hart, Associate Professor of Weaving and Designing, will teach the textile courses which will include the fixing and setting of plain, dobby and jacquard looms, analysis of fancy fabrics, and the designing of dobby fabrics.

The course in cotton classing will be taught by Dr. J. B. Cotner, a member of the college faculty and a licensed Government grader who has taught similar courses at State College for the past 12 years with marked success.

Arrangements have been made so that a mill man may devote all his time to any subject in which he is interested, or he may divide his time between two or more subjects.

Further information regarding the cotton classing course can be secured by writing Dr. J. B. Cotner, State College Station, Raleigh, N. C., while information regarding the textile courses can be secured by writing Dr. Thomas Nelson at the same address.

Rayon Dyeing and Finishing—6

By **B. L. HATHORNE**
Consulting Textile Chemist

(*All Rights Reserved by the Author*)

CHAPTER V—DYEING AND FINISHING OF CIRCULAR KNIT RAYON FABRIC

(Continued from page 319, May 8 issue)

DISCUSSION OF DRYING AND FINISHING EQUIPMENT

Dye Tubs

BEFORE the introduction of rayon, practically all underwear fabrics were composed of relatively coarse cotton and merino (mixture of cotton and wool) yarns. Experiments proved that such fabric could best be handled in the deep type of dye machine.

The introduction of rayon into the underwear field found mills already equipped with this type dye machines. Naturally, these machines were also utilized for the dyeing of new rayon fabric. New mills, which were built to meet the demand for circular knit rayon at first copied the equipment of the old mills and also installed the type of dye equipment that had been successfully used for wet processing underwear fabric.

It was soon found that light rayon fabric did not stick to the bottom of the machine in the same manner that cotton and merino fabric does; but instead floated on the surface.

Two troubles were and are caused by the tendency of circular knit rayon fabric to float during wet process operation, these are:

(1) Tangling
(2) Uneven Dyeing

Heavy fabrics are successfully processed in the deep type machine because these fabrics stick to the bottom and follow the contour of the tub as was intended by the designer, thus allowing large quantities of such fabric to be handled with very little tangling and chafing.

The nature of circular knit rayon fabric is such that air is readily admitted to the inside of the tubular fabric and once admitted is very difficult to remove. This imprisoned air causes the fabric to float to the surface of the wet processing bath and often causes rayon fabric handled in the deep type of dye machine to become badly tangled.

Uneven Dyeing

The tendency of rayon fabric to float in the deep type machines make additions of dyestuff to such machines a very slow and tedious matter. If dyestuff is added rapidly, as was intended by the designer, the floating fabric which rests against the "feed box" becomes heavily stained, thus necessitating a longer treatment than would otherwise be necessary in order to produce a level dyeing.

Troubles encountered with the deep type dye machine led to the use of the shallow type or silk type, for processing rayon fabric. This machine differs from the old type in only two details:

(1) The goods are caused to pile up on the back of the machine rather than to slide along the bottom.
(2) A "Back Board" forces the bulk of the goods to remain in the back part of the dye tub.

This machine is today largely used for the dyeing of circular knit rayon fabric and has overcome the two disadvantages of the older type. When properly loaded, fabric rarely ever becomes tangled in these new machines. Also, the addition of dyestuffs has become a very simple matter, as the color (provided, of course, that suitable dyestuffs are used) can be poured directly into the front of the tub without danger of producing uneven dyeings.

Means of Unloading Dye Tubs

Three methods of unloading circular knit rayon fabrics from the dye tub are in use today. The first is the conventional overhead unloading reel which has been used for many years in conjunction with piece-dye kettles.

The second method has long been used throughout the silk industry. It calls for a movable board which may be placed in the back part of the dyeing machine and upon which cloth is allowed to fold while the machine is run as usual. It is entirely satisfactory as a means of handling the fabric, but is slow and unnecessarily laborious.

The latest method of handling this fabric is undoubtedly the most satisfactory method at present in use. This method consists of a simple gas pipe rack equipped with a series of movable hooks upon which canvas bags may be hung. The fabric is thus removed from the machine direct to the clean canvas bags, which can be filled with fabric and then immediately closed to prevent all foreign material from coming into contact with the fabric.

It has been found that fabric is in much better condition to feed to the dryer when it has been collected in a bag, than when it has been allowed to pile loosely into the truck or upon a flat surface at the back of the kettle.

Extractors

No special mention need be made here of extractors, as the machines used for extracting water from rayon are the same as are used for most extraction processes throughout the entire textile industry.

Dryers and Drying Methods

Loop Dryers

A large percentage of all circular knit rayon fabric is today dried in the well known loop or festoon dryers. Although the first cost of these machines is high, they are economical in the long run and have been found to be well suited for drying rayon fabric.

Due to the high initial cost of these machines, there is a tendency on the part of the trade to use shorter units than can safely be used and also to run the machines at too high a temperature in order to speed up the machine and increase production. This results in the production of a harsh fabric and also causes the owners of such fabric direct financial loss, as the use of too high temperature results in the production of "bone dry" fabric which prevents the proper absorption of moisture by such fabric during the subsequent finishing processes.

Although the legal regain for rayon is 11%, it is rare indeed that a roll of circular knit rayon fabric finished in the conventional manner will be found to contain more than 8 or 9% regain. As such fabric is sold on a poundage basis, the difference results in a direct financial loss to the owner of the fabric. If this condition were more thoroughly understood, it is evident that drying would be carried on at a more moderate temperature even though dryer production is thereby decreased.

Pipe Method

Many of the older underwear concerns are still drying tubular rayon fabric by the pipe method. These dryers enable fabric to be dried cheaply and quickly, but unfortunately cause it to become overdried in the same way that fabric is often overdried in loop dryers.

Low Temperature Dryers

A few mills have installed an automatic hanging arrangement which allows fabric to be looped on sticks in such a way that the sticks can be suspended on trucks and moved into a low temperature room where the fabric is allowed to dry slowly at low temperature.

Drying Rooms

Small mills have found it economically advantageous to build a special "drying room" for circular knit fabric. These rooms usually contain:

(1) A series of bars or poles parallel to the ceiling and low enough to allow fabric to be hung from the same by an operator.
(2) Steam pipes on the floor to supply the necessary heat.
(3) An exhaust fan.
(4) A free running roller just inside the door (allows fabric to be easily pulled over suspension poles).

After extraction the fabric is pulled by hand over the loose roller and over the poles to the far end of the room, it is then pulled down between the poles in the form of loops.

As fabric is usually allowed to dry slowly overnight in such rooms, the temperature can be kept at or below 120° F. Fabric handled as described above is never allowed to become "bone dry," as the night watchman is instructed to inspect it each hour and to shut off the steam when the fabric is sufficiently dried. During the remaining hours, the fabric hangs in the room the exhaust fan is allowed to run in order that the cloth may regain its natural moisture content.

Finishing Machinery

Although the various machines available for finishing circular knitted rayon fabric differ greatly in appearance, cost, and quality of fabric produced, they all embody the same general principles. These are:

(1) A means of opening or spreading the tubing.
(2) A means of blowing steam through the tubing.
(3) A means of flattening the fabric. (Two rollers operated under pressure. In the better types of machines these rollers are water cooled.)
(4) An air draught for cooling the fabric.
(5) A device for rolling the fabric into its final finished form.

The simplicity of the finishing apparatus necessary for handling circular knitted rayon fabric has caused many mills to build their own machines, embodying the above outlined principles.

DISCUSSION OF SCOURING

Loading Problem

Price competition has so reduced the profit to be derived from the dyeing of circular knitted fabric that production is today of vast importance in the dye house.

One method of increasing dye house production is a means of rapidly loading the dye kettles. Of the several methods employed, the three most popular are listed below:

1. *Emersion of Rolls in Liquor*

Rolls of circular knitted fabric are immersed in the liquor in front of the power driven reel; the ends are thrown over the reel and brought forward to the front of the machine. The machine is run in the usual manner until all of the fabric is piled at the rear of the machine, after which the inside ends of the roll are thrown over the reel and are tied to the outside ends of the fabric in the usual manner.

2. *Pre-Loaded Trucks*

The fabric is loaded into trucks consisting of a number of very narrow compartments. The trucks are pushed to the front of the machine after which one end of fabric from each roll is thrown over the power driven roller and the machine loaded in the conventional manner.

3. *Pre-Folding*

The fabric is run over a folding device, the ends are tied and the bundles thrown into a truck. At the proper time these bundles are placed side by side in the back of

the machine after which one end of each bundle is threaded through the machine. This method loads only one-half of the machine at one time as the fabric takes up much more room while dry than after it is properly wet out.

Variable Scouring Factors

Oil

A large proportion of the scouring difficulties encountered by dyers of circular knitted rayon are due to the presence of large quantities of oil in the fabric. The difficulties are considerably augmented by the tendency of coners of rayon yarns to use the cheapest grade of rayon lubricant available without thought of the scouring difficulties that will later be encountered by the dyer.

Circular knitted rayon fabric contains an average of 6 to 15% of such oils which must be emulsified during the scouring process. This large quantity of oil makes necessary the use of an equally large quantity of soap and alkaline materials in the scouring bath.

Water

Most dye houses built for the dyeing of circular knitted rayon fabric have been built very close to the knitting mills which produce such fabric in order to reduce trucking cost, and to speed deliveries. Unfortunately, it so happens that due to the presence of appreciable quantities of lime and magnesium salts, the water in many of these sections is not suited for dyeing operations.

Although it is well known that lime and magnesium can be readily removed from water by means of natural and artificial Zeolites, it unfortunately happens that most dye houses already built have not sufficient capital to install such systems as are commercially available, or apparently do not realize the savings that will result from such installations. Most circular knitted fabric dyers are therefore confronted with the problem of holding appreciable quantities of lime and magnesium soaps, as well as a large quantity of mineral oil, in emulsion during the scouring process. This necessitates the generous use of soap and alkali or the use of one of the newer lime resistant detergent materials.

Steam

The largest single item of expense in the dye house, labor excluded, is steam. Realization of this fact often tempts dyers to run scouring baths for a shorter period of time than is necessary to properly cleanse the fabric. It also tempts them to run the scouring baths at much lower temperatures than are known to be necessary for complete scouring.

Chemicals

Scouring baths for tubular rayon fabric usually contain three ingredients, soap, alkali, and a solvent.

Soap

Only two types of soap are largely used for this type of fabric. These are the sodium soaps of olive and red oils.

Alkali

Two alkalies are used in about equal quantities. These are tri-sodium-phosphate and sodium carbonate. Tri-sodium-phosphate is used when particularly hard water is encountered as it considerably retards the precipitation of lime and magnesium soaps. Mills having fair to good water conditions usually use sodium carbonate because of the difference in cost between the two alkalies.

Solvents

It has been found that the use of solvents capable of forming an emulsion in a mild alkaline soap bath reduces the time of scouring. It also retards the formation of large oily masses composed of lime and magnesium soaps combined with mineral oils. For this purpose pine oil, benzol and hexaline (a hydrogenated hydro-carbon) are largely used.

These solvents are added to highly concentrated hot soap solutions after which they are poured into the scouring bath.

Time

The shortest period in which a full machine load of oiled circular knitted rayon fabric may be properly boiled off is one hour.

New General Releases

The General Dyestuff Corp. has issued circulars on the following subjects:

Ramasit K Conc.—a new waterproofing product, applied by the one bath method, suitable for wool, silk, cotton and rayon fabrics.

Diazopon A—a product added to the developing bath of Naphthol AS dyeings and said to result in improved resistance to rubbing.

Diazo Brilliant Green 6G—a homogeneous color which with Developer ZA produces bright yellowish greens said to be dischargeable to a perfect white.

Diazo Dyestuffs on Rayon Discharged with Rongalite C—36 different brands are shown with white discharges.

Stockinet Plated with Rayon—Fastusol and Indanthrene colors which are said to dye cotton and rayon an even shade are illustrated.

Dyeing of Acetate Silk—dyeing methods and the best suitable dyestuffs for the different fabrics are pointed out.

Fastusol Black VE—direct dyestuff said to be fast to light similar in shade and properties to Benzo Fast Black LA, but is said not to reduce in boiling.

Palatine Fast Red BRE—a new brand of the Palatine Fast series, principal feature is said to be its very level dyeing property and it is claimed that it is the best red to be used in combination shades.

Compound Shades Produced with Indanthrene Dyestuffs—The dyestuffs illustrated have been especially selected for dyeing goods which have to stand severe light exposure.

Copies of the above may be had on request.

Thickening Materials for Textile Printing*

By **FRED G. LA PIANA**
Stein, Hall & Co.

SINCE the introduction of coal tar products, the preparation of colors for textile printing, has been more of a science than an art, and although in some instances there is still recourse to the old "rule of thumb" methods it is useless nowadays for a color mixer to attempt to keep abreast of times unless he posseses a sufficient knowledge of chemistry to obtain the effects he is looking for without referring to his grandfather's receipt book. This holds true not only in so far as it concerns the preparation of the coloring matter itself, but also in regard to the selection and the preparation of the proper thickening necessary to carry and transfer the coloring matter to the cloth.

The purpose of this discourse is to examine under the light of scientific investigation the more important materials, and methods employed in the preparation of color thickenings so that it may be properly and economically transferred to the cloth through the medium of the printing machine.

Substances Used for Thickening Color Solution

The substances used for this purpose may be divided into two distinct classes. Those which are used solely as thickening agents and carriers and afterwards removed as completely as possible from the cloth, and those which are both thickening agents and fixing or binding agents and are left on the cloth forming, as they do, an integral part of the finished color. In this short discussion we will treat mostly of the materials belonging to the first class.

Starches

The starches most commonly used in this country for printing are: Wheat starch, corn starch and tapioca flour.

Wheat Starch. A 12 to 15 per cent concentration gives a sound, workable paste with good keeping qualities, which despite its fairly thick body allows the color to penetrate well into the body of the cloth and yields shades that are full and opaque. This paste is used either alone or mixed in any desired proportion with other suitable thickenings as required.

Corn Starch. Corn starch used alone may replace wheat in some instances, although the paste resulting from it is not as smooth and sound. Corn starch is unsuitable for thickening stock colors as it deteriorates rapidly on keeping, breaking up into a rough, curdy and lumpy state with separation of water. This can be remedied by the substitution of 20 to 50 per cent of its weight of high grade tapioca flour. This substitution improves the stability and smoothness of the paste considerably and enables corn to be used with advantage in many colors, especially those consumed in large quantities and which are of necessity made up at frequent intervals.

Tapioca Flour. Paste made from tapioca flour alone is very stringy and rubbery and hard to spread evenly, consequently is not suitable alone for thickening colors, but when mixed with corn starch, as stated above, or when otherwise modified, gives very goods results. In choosing tapioca flour for printing paste it is important to choose a high grade flour, as flours of low or medium grade do not stand up as well and deteriorate very easily if kept any length of time in paste form. A thickening made partially or all from tapioca flour has better penetrating power than wheat starch and its film is less brittle and softens very easily under the action of steam.

Dextrine and British Gum. These are products made from starches by roasting. Strictly speaking, the term dextrine is applied to degradation products of starch obtained by heating after spraying with dilute mineral acids. British gums are usually products obtained by roasting the starch without the addition of acid. From a practical printer's point of view, the difference between dextrine and British gums is largely a question of color, thickening power or viscosity, and rinsibility. Dextrines and British gums can be obtained in any degree of solubility, difference in color and solubility being to a large extent controlled by the duration and temperature of the roasting process. The less a dextrine or British gum is converted, the more its water solution approximates the qualities of starch paste and the less gummy the thickening will be. Practically all the British gums and dextrines used for printing in this country are made from corn starch or tapioca flour. The kind of work and the cost are the deciding factors as to which to use.

Gum Tragacanth. There are many grades of this gum varying in thickening power, cleanliness and color. The price varies according to the grade. Gum tragacanth may

*A paper presented at the Annual Meeting, National Association of Textile Printing Colorists, Saturday, April 22 and reported through *Fibre and Fabric.*

be used alone, but in combination with starch is unexcelled for printing dark, heavy blotches. It is very often employed solely for adjusting the viscosity of pastes that are too thin. Lately a large quantity of the cheaper grades of this gum has come in the market. In print shops that are properly equipped to handle these grades they have shown quite a saving in the cost of thickening material. As tragacanth solution mixes well with most of the other thickenings many types of cheap printing pastes can be obtained by varying the ingredients and the proportions in the mixture with the aid of this gum.

Gum Senegal, Gum Arabic, Indian Gum or Karaya, Gum Gedda, Gum Gatti, Gum Shiraz and Locust Bean Gum. All these gums are natural gums, complex in composition and constitution, but they are composed in the main of one or all of three components: arabin, cerasin and bassorin, together with a little lime, potash and magnesium. They vary in thickening power and all of them require prolonged boiling in water for complete solution and in the case of some the boiling must be conducted under pressure and sometimes with the addition of acetic or other acids. With very few exceptions, especially when maximum rinsibility is desired, British gums and dextrines, particularly if made from tapioca, can be used for the same purpose as these gums. Thickenings made from British gums not only are cheaper and more rapidly prepared, but are capable of yielding just as satisfactory results.

Thickening and Binding Materials. To the second class of thickenings which act as mechanical fixing agents for pigments and the like, belong albumen and casein. The advantage of these products lie in the fact that they can be coagulated by steaming the goods, or (more effectively) by padding in formaldehyde, thus producing a transparent film insoluble in water.

There are two methods of making up printing colors. One is to boil the thickening agent and coloring matter together. The other is to boil and prepare the thickening agent first and then mix with it hot or cold the solution of coloring matter. In many cases it is quite immaterial which method is used, but some dyestuffs always require boiling, while some other kinds can only be prepared with ready-made thickening and often only in the cold. Wherever possible it is preferable to make use of the second method as it is more convenient and the colors can be prepared more quickly. On the other hand when large quantities of color, that can be boiled, are required, it is always better to boil with the thickening because large batches can be mixed better in a kettle with mechanical agitation than by stirring up in a tub by hand. Also the whole batch of color being of the same viscosity and shade throughout will give perfectly uniform results in printing, whereas if it had been prepared in small, separate lots it would be likely to vary a little in both consistency and shade. One important factor should always be kept in mind and that is that all thickening pastes are much better when freshly prepared than after a long standing when they show a tendency to decompose, lumps or otherwise become unworkable. Starch becomes sour and thin. British gums, if not very soluble, sets into a solid mass while natural gums are apt to be coagulated by the substances mixed with them.

Preparation of Starch Paste. The usual concentration of a starch paste for printing is about a pound of starch to a gallon of water, or 12 to 15 per cent. The starch is first of all stirred up with cold water into a smooth, cream-like mixture and then boiled until the thickened mass begins to thin again. It is very important if a smooth paste is to be obtained that the starch be well boiled till the maximum thickening point is past and the cooling should not be started until the paste commences to thin and become fluid again. The paste should be stirred continuously during the whole of the time that the boiling and cooling are in progress. When solutions of dyestuffs are directly boiled with the starch, the same procedure is adopted. The starch is mixed up with the water, the dyestuff added and the mixture is then boiled and cooled. In most of the shops the starch is boiled in a steam jacketed kettle furnished with stirring apparatus. There are some objectionable features in this method of boiling starch. It is usually not feasible to have the arms of the stirring apparatus run close enough to the sides of kettles so as to scrape all the starch that swells and hangs there as soon as the temperature gets high enough for the starch to burst. This layer of starch paste partially inhibits the transmission of heat and so prolongs the time required to boil the whole mixture. Furthermore, this layer of starch will be overlooked, and harder than the rest of the mass, causing unevenness and lumps.* Here I would like to suggest that much better results would be obtained if the starch were boiled with live steam instead of jacketed steam. The only modifications, beside the mechanical, necessary in this case would be to change the formula to take care of the extra amount of water that the paste would contain, due to the condensation of steam. In a few places that I know of where this change has been made not only has the time for boiling the starch been shortened but the resulting paste is more uniform and of better quality.

Dextrine and British gum thickenings are simply mixed with cold water, boiled and cooled. With British gum of low solubility and with mixtures of British gum and starch, the same benefits would be obtained with live steam as with starch.

Preparation of Tragacanth and Locust Bean Paste. The required quantity of gum is soaked in water until it has swelled up into a thick mass. It is then placed in a jacketed steam heated kettle and boiled and stirred until perfectly homogeneous, after which it is cooled and strained—ready for use. Running this paste through a colloidal mill before, or better after the dyestuffs solution has been added, greatly improves its quality and smoothness. In making thickenings of other natural gums the

*If it is necessary to cook starch in copper jacketed kettle, this difficulty (caking on the sides of the kettle) can be overcome by raising the temperature very slowly to the boiling point.

gum is first stirred up with cold water for some time. The floating bits of chip, woody fiber, etc., are then skimmed off and the whole is heated for several hours in a jacketed kettle provided with agitator. When the solution is complete the hot thickening is put in casks and allowed to stand several days for the purpose of allowing the sandy matter to deposit. The gum is then strained and ready for use.

Albumen Thickenings. Albumen is best dissolved in water at 20 to 25 degrees C. The usual strength of the solution being anything from 35 to 50 per cent. The albumen is added to the water and well stirred up for a few minutes. The whole is then allowed to stand twenty-four hours or more, being again stirred up every few hours, until the solution is complete. Casein is insoluble in hot or cold water, but dissolves easily in warm concentrated borax solutions and if a sufficient quantity is taken gives a thick, smooth paste, very suitable for machine printing.

Straining. No matter how carefully the thickenings are prepared, very often they contain lumps or hard pieces. A certain amount of thickening invariably cakes on the sides of the kettles, as stated above, when the boiling is done with jacketed steam. A skin forms on the surface after standing and portions of it are liable to become incorporated with the smooth paste beneath. For this reason it is necessary to strain the thickening. In some shops this is done before and after it is mixed with the dyestuff; in some shops only after. In the latter instance it is strained by hand directly into the tub that is to be sent in to the machine print room.

Functions and Properties of Thickenings

Color Value. The function of a thickening is simply to act as a vehicle for carrying the color to the cloth and as a preventative against its spreading, by capillary attraction, beyond the limits of its allotted space in the design. It ought not, therefore, possess more affinity for the dyestuff with which it is mixed than the fiber; otherwise on washing it out of the cloth most of the color would be removed along with it. If it were possible to produce a thickening capable of transferring the dyestuff to the cloth 100 per cent the color value of this thickening would be 100 per cent. Therefore color value as applied to a thickening is the capacity of this thickening to free the dyestuff from its own grip, so it can be absorbed by capillary attraction fixed and developed in the fiber of the cloth. When applied to the cloth the dyestuff which is dissolved or dispersed uniformly through the body of the thickening has to travel through the depth of the film formed by the thickening before it comes in contact with the fibers. This happens either when the film is still wet or when it becomes plastic again in the steaming or aging operation. In consequence the less dense the solid concentration, or the thinner the film, the easier it will be for the major part of the dyestuff to reach the fiber. This theory is confirmed by experience and every printer knows that, as a general rule, the greater the weight of thickening material contained in a given volume of color paste the lighter will be the shade and conversely the less the quantity of thickening material the deeper will be the shade. For this reason gum solutions and starch pastes which despite fairly thick body, contain large amounts of water, allow the dyestuff to be well absorbed by the cloth and they yield shades that are fuller and more opaque than those yielded by any of the gums which only take from one to three times their own weight of water.

Viscosity. The viscosity of a thickening exerts considerable influence on the quality of the impression produced by the engraved roller. It is impossible for anyone by mere inspection to estimate with any degree of certainty the relative printing qualities of two colors that are thickened with totally different materials. British gum thickenings, rarely or never appear to be as viscous as starch or tragacanth pastes, but viscosity, considered merely as stiffness, is not the only desirable quality in a printing paste. It must also possess a certain body and this, to a great extent, is dependent upon the density, or in other words, upon the percentage of dry thickening material in the paste as well as upon the nature of that material. British gum or dextrine solutions often contain three or four times more dry thickening than starch and other similar pastes, and as a result they give a much crisper and more perfect impression of the pattern than could be obtained from a starch thickening apparently many times their viscosity of stiffness. The explanation of this behavior is due to the fact that they contain more solids to fill the interstices between the fibers of the cloth and in this way check the capillary attraction for the dyestuff. Generally if the thickening is too thin and its water content too high the impression will be ragged and blotted, the color will spread out through the capillary attraction of the cloth beyond the proper limit, the lines and masses of the pattern will exhibit soft, spongy edges, the finer details will run together and the whole effect will have an unsightly blurred appearance due to the general lack of sharp definition. On the other hand thickenings that are too viscous and stiff produce very bare, weak impressions, not because there is any deficiency of color in the engraving, but because it is too solid to be absorbed by the cloth. Delicately engraved patterns printed with very viscous pastes scarcely make a mark on the cloth, and heavy patterns coarsely engraved leave an impression which, instead of being full and even, lies on the surface of the cloth and shows up nearly every line of the engraving. Both these faults are due to the same cause, namely, the inability of the dyestuff to soak through the dense film of the thickening into the body of the fabric.

Rinsibility. Except in the case of pigments printed cloth in its finished state is freed as far as possible from all thickening matters which have been used during the printing, and which, if allowed to remain, would not only impair the purity and beauty of its colors but also impart an undesirable stiffness to the printed parts of the cloth. The facility and the degree with which the cloth is freed from the thickening materials of course depends both on the methods used for dissolving the

(Continued on page 341)

PROCEEDINGS OF THE
American Association of Textile Chemists and Colorists

MAY 22, 1933

Officers of National Association

President

ROBERT E. ROSE
E. I. Du Pont de Nemours & Co., Wilmington, Del.

Vice-Presidents

WILLIAM H. CADY—ALEX. MORRISON

Treasurer

WILLIAM R. MOORHOUSE
National Aniline & Chemical Co., Boston, Mass.

Secretary

A. NEWTON GRAVES
Franklin Process Co., Providence, R. I.

Councillors

RALPH F. CULVER
H. M. CHASE
CARL Z. DRAVES
WILLIAM D. APPEL
HUGH CHRISTISON
WALTER M. SCOTT

President Emeritus and Chairman of the Research Committee

LOUIS A. OLNEY
Lowell Textile Institute, Lowell, Mass.

Local Sections and Their Officers

Northern New England Section
Leverett N. Putnam, Chairman, Worsted Division, Pacific Mills, Lawrence, Mass.
Clarence L. Nutting, Secretary, Arlington Mills, Lawrence, Mass.

Rhode Island Section
Heyward F. Lawton, Chairman, Borden & Remington Co., Providence, R. I.
C. Brian Wainwright, Secretary, Apponaug Co., Apponaug, R. I.

New York Section
Henry F. Herrmann, Chairman, General Dyestuff Corp., 230 Fifth Ave., New York City.
Thomas R. Harris, Secretary, Herrick & Voigt, 220 E. 42nd St., New York City.

Philadelphia Section
William A. Stringfellow, Chairman, Ankokas Mills, Mount Holly, N. J.
Charles A. Seibert, Secretary, 39 Chestnut St., Salem, N. J.

Piedmont Section
A. R. Thompson, Jr., Chairman, North Carolina Finishing Co., Salisbury, N. C.
Hugh Puckett, Secretary, Chas. H. Stone, Charlotte, N. C.

South Central Section
Harold Schroeder, Chairman, Dixie Mercerizing Co.
Andrew Kelly, Secretary, Burkart-Schier Chemical Co., Chattanooga, Tenn.

Midwest Section
Carl E. Bick, Chairman, Real Silk Hosiery Mills, Indianapolis, Ind.
Frank J. Acker, Secretary, National Aniline & Chemical Co., Chicago, Ill.

South-Eastern Section
E. A. Feimster, Jr., Chairman, Eagle and Phoenix Mills, Columbus, Ga.
Charles B. Ordway, Secretary, Alabama Polytechnic Institute, Auburn, Ala.

Lowell Textile Institute Junior Section
Joseph J. Pizzuto, Chairman; Raymond L. Matthews, Secretary.

North Carolina State College Junior Section
R. A. Gilliam, Chairman; D. B. Hardin, Secretary.

Meeting of the Inter-Society Color Council[1] and the Colorimetry Committee[2] of the Optical Society of America*

Columbia University, February 25, 1933

The meeting was opened with a discussion of the problem presented by the U. S. Pharmacopoeia to the Inter-Society Color Council. Work of the Council's Committee on Measurement and Specification in this connection was outlined in some detail for the benefit of those present. Work of the Council's Committee on Color Names was then taken up by Mr. Munsell who described a method of approach to the subject through the formation of a cylindrical Building of Color, each room of which was of equal floor area. Each room was designated by a code number made up of three numbers, indicating the average hue, brilliance and saturation of each room. Mr. Jones commented favorably on this "volumetric" method of reporting color because, in a practical way, it shows not only color locations, but also color tolerances.

In relation to partial color blindness, Mr. Macbeth described methods used by Mr. Priest to furnish a partially color blind person with a strong ruby red illumination under which he was able to discriminate and match colors in exactly the same way as a normal person does.

The furnishing of a north sky illumination on the south side of a building was also interestingly described by Mr. Macbeth. In this case sand-blasted panes of slightly bluish glass changed the sunlight into north sky illumination.

Work in progress by the Optical Society of America on the revision of the 1923 report of their Colorimetry Committee was outlined by Mr. Jones. It was the belief that this report should be brought up to date to include new material, together with a popularly worded introduction describing briefly the underlying principles of physics, chemistry and psychology, illustrated with colored plates. It was furthermore suggested that the report carry a more detailed description of spectrophotometry that would be in line with the report on photometry of the Illuminating Engineering Society. It was suggested that the report appear in serial form, when revised, in the Journal of the Optical Society of America, to be ultimately collected in book or pamphlet form for reprinting.

As a final step, stress was laid on the fundamental purpose of the Inter-Society Color Council in linking together art, industry and science.

Respectfully Submitted,
M. Rea Paul,
Secretary.

[1] A. E. O. Munsell, Chairman.
[2] L. A. Jones, Chairman.
*Carl Z. Draves, official delegate of the A.A.T.C.C.

THE MOTH—FRIEND OR FOE?

(Discussion continued from page (192) 288, April 24th issue)

Chairman Herrmann: I take it, Mr. Dessow, that Eulan serves its best purpose applied by the woolen manufacturer during the processing of his cloth?

Mr. Dessow: Yes, sir. The woolen mills are best equipped to carry on that sort of work. One application by them lasts for the life of the fabric.

Mr. Barbour: When does the woolen mill do it—after the yarn is spun?

Mr. Dessow: There are different methods of application suited to the particular requirement of the mill. Yarn spinners, for instance, apply Eulan to tops before spinning the yarn. Other mills have a preference for applying it as a last wet finishing. There are other mills that use Eulan as part of their rinsing operation. Then there are some others that combine it with their dye bath.

Mr. Barbour: When they do it as a wet finish do they put it through the brushing machine?

Mr. Dessow: Through a regular padding or brushing machine.

Chairman Herrmann: Are there any more questions?

Mr. Chase: I would like to ask, roughly what is the cost of the Eulan treatment per pound of wool?

Mr. Dessow: Roughly the cost would be about four cents per pound.

Mr. Chase: It wouldn't add much more than a quarter to the price of a suit of clothes, then?

Mr. Dessow: The actual cost on a suit of clothes or an overcoat would be very nominal. My own experience in inquiring—of course, I am interested in the particular subject—is that almost every individual would be satisfied to pay 25 cents or 50 cents or a dollar for any article that he could get with the assurance that it was definitely and permanently moth-proof.

Chairman Herrmann: Are there any more questions? If not, the hour is late enough that I think we will draw our meeting to a close.

I will call for a rising vote of thanks for the two speakers.

. . . The members arose and applauded, extending a rising vote of thanks to the speakers, Mr. Stott and Mr. Dessow . . .

. . . The meeting then adjourned at 9:50 o'clock. . .

N. C. STATE COLLEGE SECTION

THE North Carolina State College Student Section of the American Association of Textile Chemists and Colorists recently had as their guest, Mr. E. P. Davidson, Charlotte laboratory manager of E. I. du Pont de Nemours & Co.

"Sulfonated Fatty Alcohols" was the subject discussed by Mr. Davidson. He stressed the use of Avirols and Gardinols for use as finishing materials as well as dyeing and bleaching assistants.

A general discussion was held following the talk and the speaker was kept busy answering numerous questions in regard to the products which are so rapidly becoming popular in the industry.

The Student Section of N. C. State College is expecting to have as their guest and speaker, Dr. R. E. Rose, National President of the Association, at the next meeting.

APPLICANTS FOR MEMBERSHIP

Active

C. A. Funke—Secretary, Nova Chemical Co., 200 Hudson St., New York, N. Y. Sponsors: H. G. Macdonald and A. Newton Graves.

T. J. Marler—Chemist and Sales Manager, Manufacturers Soap & Chemical Co., Cleveland, Tenn. Sponsors: Harold Schroeder and A. Newton Graves.

Carl E. Weiss—General Manager, Textile Printing & Finishing Co., Lebanon, Pa. Sponsors: E. F. Ernst and C. W. Kuhl.

James Lees—Worsted Dyer, Farr Alpaca Co., Holyoke, Mass. Sponsors: B. C. Bond and R. E. Derby.

Junior

W. T. Corn—Vice President & General Manager, Manufacturers Soap & Chemical Co., Cleveland, Tenn. Sponsors: Harold Schroeder and A. Newton Graves.

Peter Richmond—Assistant to the General Manager, and Purchasing Agent Crompton Co., West Warwick, R. I. Sponsors: Joseph C. Laycock and Herbert A. Matteson.

W. Flaccus Stifel—Assistant Colorist and Chemist, J. L. Stifel & Sons Co., Main & Fourth Sts., Wheeling, W. Va. Sponsors: Elmer C. Bertolet and Howard A. Walter.

Student

Kenneth L. Stearns—Student, Lowell Textile Institute, Lowell, Mass. Sponsor: L. A. Olney.

S. R. Lokur—Student, Lowell Textile Institute, Lowell, Mass. Sponsor: L. A. Olney.

Earl V. Atkinson—Student, Alabama Polytechnic Institute, Auburn, Ala. Sponsor: Charles B. Ordway.

Associate

J. B. Gillespie—Sales Dept., Tennessee Eastman Corp., Kingsport, Tenn. Sponsors: Leslie L. Cobb and Paul F. Haddock.

Horace D. Acaster—Sales Engineer, Calco Chemical Co., Inc., Philadelphia, Pa.

Orrin W. Pineo—Textile Research, Mass. Institute of Technology, Cambridge, Mass.

Chicago Invites the World

The A.A.T.C.C. Invites YOU!

Proceedings of the American Association of Textile Chemists and Colorists

Smiling serenely from its stone throne, this image of Avalokitecvara, looks past an array of bronze incense burners, prayer wheels, sacred vessels and other ceremonial objects toward those who come to visit its shrine in the Chinese Lama Temple at A Century of Progress

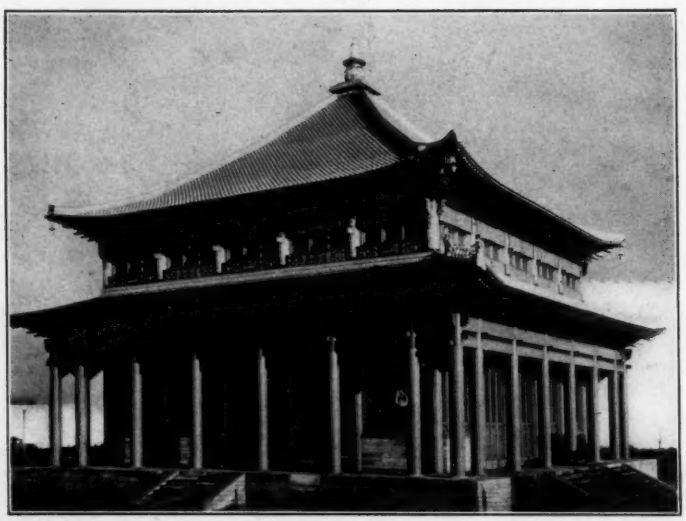
A A T C C

CONVENTION

September 8th and 9th

Congress Hotel and Annex, Chicago

WE DON'T know much about existing conditions in the Far East, nor have we given much attention to the war between China and Japan for possession of the Province of Jehol. It comes to mind because we have made a preliminary excursion to the World's Fair Grounds and have seen the replica of the Golden Temple of Jehol. Anybody who is at all curious about the manner in which the "other half of the world" lives would certainly be interested in viewing this "what you call Chinese church," to use the phrase of the Chinese guide who conducts visitors on a tour of inspection.



This temple, which is a reproduction of China's finest Lama temple, is the gift to the Exposition of Vincent Bendix, millionaire industrialist, who commissioned Dr. Sven Hedin, noted Swedish explorer, to bring to Chicago the finest existing example of Chinese Lama architecture. Few people outside the Celestial Empire ever glimpsed this shrine in the days of its glory when the Manchu emperors reigned. The Golden Pavillion, seat of worship of the Manuchu emperors, was copied faithfully by North Chinese architects and artisans, shipped in twenty-eight thousand pieces to Chicago, and put together like the parts of some huge Chinese puzzle. No nails are used in its construction.

The roof is of copper shingles covered with gold leaf. Massive wood columns, colored in red lacquer, support the lower deck, form part of the wall support and hold the gilded ceiling and upper roof deck in place. Elaborately carved grilles in many brilliant colors enclose the glass window panes. The cornices beneath the roof decks are formed by carved pieces of wood, dovetailed together, and the cornice beams are gilded and carved with images of dragons, cats, dogs, and birds.

In the innermost "holy of holies" of the temple, rare Oriental treasures are on display. There are images of Buddha and other Lama gods and goddesses, altar pieces, incense burners, drums, prayer wheels, trumpets, cymbals, masks used in the sacred dances, temple bells, rare carpets, wall hangings, and other interesting paraphernalia of this fast vanishing form of worship.

When the Chinese people go to this "church" they gather outside. Only the priest may enter. He kneels before the prayer wheel, turns the wheel to the particular prayer desired and in the prescribed manner, invokes the blessing for his followers.

The huge bronze bell and the incense burner at the entrance are more than five hundred years old. The glass temple bells on the outside corners are to warn away all evil spirits. Their tinkling in the evening breeze, accompanied by the odor of burning incense, is a delightful reminder of the age old search for soul comfort.

EIGHTY-EIGHTH COUNCIL MEETING

THE Eighty-eighth Council Meeting of the American Association of Textile Chemists and Colorists was held at the Bureau of Standards, Washington, D. C., March 31, 1933 at 1:30 P. M.

The following were present:—

President: R. E. Rose.

Treasurer: Wm. R. Moorhouse.

Councilors: Wm. D. Appel, Carl Z. Draves.

Councilors ex-officio: Henry F. Herrmann, Chairman, N. Y. Section; Heyward F. Lawton, Chairman, R. I. Section; Prof. L. A. Olney, Chairman, Research Committee; Donald H. Powers, representing Chairman, Phila. Section.

Secretary: A. Newton Graves.

The report of the last meeting was read and approved.

The Secretary's balance sheet was read as follows and approved:—

Secretary's Balance Sheet—March 29, 1933

Cash on hand January 24, 1933			$ 526.02
Receipts January 24, to March 29, Incl.:			
Applications	34 @	$5.00	170.00
Applications	10 @	2.50	25.00
Applications (Corporate)	1 @	25.00	25.00
Dues (1933)	146 @	5.00	730.00
Dues (1933)	3 @	2.50	7.50
Dues (1933)	1 @	4.82	4.82
Dues (1933)	1 @	4.04	4.04
Dues (1933)	1 @	3.90	3.90
Dues (1933) Sustaining	1 @	10.00	10.00
Dues (1933) Corporate	1 @	100.00	100.00
Dues Arrears	1 @	2.50	2.50
Analytical Methods (Booklet)	63 @	.75	47.25
Analytical Methods	1 @	1.00	1.00
Analytical Methods	1 @	.95	.95
Pin Sales	1 @	1.50	1.50
Reporters (Howes Publishing Co.)			7.75
Silk Standards & Postage			2.06
Worsted Tubing 50 yds. @ .20 per yd.			10.00
Yearbooks	6 @	3.00	18.00
Disbursements:			
To Treasurer, March 21st, General Fund			$1,000.00
Government Tax on Checks			.02
Checks returned due to Banking Holiday 6 @ $5.00			30.00
Cash on hand, Nat'l Bank of Commerce & Trust Co.			625.77
Cash on hand			45.00
			$1.700.79

The Treasurer's Report was read as follows and approved:—

Treasurer's Report—March 30, 1933

GENERAL FUND

Cash on hand—January 26, 1933	$7,546.81
Receipts—January 26, 1933 to March 30, 1933.	1,000.00
	$8,546.81
Expenditures—January 26, 1933 to March 30, 1933	474.04
	$8,072.77

RESEARCH FUND

Cash on hand—January 26, 1933	$3,078.87
Receipts—January 26, 1933 to March 30, 1933.	.....
	$3,078.87
Expenditures—January 26, 1933 to March 30, 1933	2,064.45
	$1,014.42

BANK BALANCE

General Fund	$8,072.77
Research Fund	1,014.42
	$9,087.19
First National Bank—Checking Account	$2,710.99
First National Bank—Savings Account	6,376.20
	$9,087.19

The following were elected to membership as of thirty days after the publication of their names provided no objections to any are received by the Secretary:

Active:

Beatty, P. C.—Box 28, Haw River, N. C. Overseer of Dyeing, Granite Finishing Works.

Borghetty, Hector C.—Aspinook House, Jewett City, Conn. Plant Chemist, Aspinook Co.

Eddy, Chester L.—Travelers Rest, S. C. Asst. Mgr., Renfrew Bleachery.

Evans, Henry D.—43 North St., Sace, Me. Chemist, Pepperell Manufacturing Co.

Gaede, A. Henry—Read House, Chattanooga, Tenn. Southern Representative, Laurel Soap Manufacturing Co., Thompson & Tioga Streets, Philadelphia, Pa.

Gagnon, Leo C.—95 Farley Street, Lawrence, Massachusetts. Boss Tester, Monomac Spinning Company.

Garbutt, Alfred I.—Box 186, Hopkinton, Mass. Colorist, Chemical Mfg. Co., Box 176, Ashland, Mass.

Greenberger, Sidney A. — Colorist, Caledonia Print Works, Clinton and 3rd Sts., Hoboken, N. J.

Griffin, W. B.—333 Elmira Place, Atlanta, Ga. Technical Salesman, Kali Mfg. Co., 1410 N. Front St., Philadelphia, Pa.

Gudgeon, William P.—Roselands, Port Nelson, Ontario. Manager, Canadian Aniline & Extract Co., Ltd., 35-39 Cannon St., E., Hamilton, Ontario.

Jacobs, Fred F.—562 W. 162nd St., New York City, N. Y. Textile Colorist, General Dyestuff Corp., 230 Fifth Ave.

Klein, Douglas—304 West Fourth St., Clifton, N. J. Superintendent, Silk Printing, Caledonia Print Works, 226 Clinton St., Hoboken, N. J.

Lewis, Oliver—52 Centreville Road, Apponaug, R. I. Woolen and Worsted Dyer.

Rainaldi, Carmine—285 Locust St., Fall River, Mass. Superintendent of Dyeing, Briston Felt Body Co., 32 Tripp St.

Stafford, Henry A.—850 Swarthmore Ave., Ridley Park, Pa. Superintendent, Ewing-Thomas Corp., Rose and Walnut Sts., Chester, Pa.

Tannenbaum, Adolph—145 Lincoln Road, Brooklyn, N. Y. Colorist, Finco Dye & Print Works, 83 Scholes St.

Titus, Edgar C.—557 East Godfrey Ave., Philadelphia, Pa. Salesman, American Aniline & Extract Co., Inc., Venango and F Sts.

Young, Fred L.—Chief Chemist, 1000 West Morehead St., Charlotte, N. C.

Junior:

Asbury, J. H., Jr.—774 West Peachtree St., N. W., Atlanta, Ga. Instructor, Georgia School of Technology.

Dittert, Charles F.—454 E. Flora St., Philadelphia, Pa. Textile Chemist, Eugene Vellner, 1209 N. Fourth St.

Dyer, J. Robert, Jr.—Chadwicks, N. Y. Textile Chemist, William S. Murray, Inc., 805 Watson Place, Utica, N. Y.

Edelstein, Sidney M.—837 McCallie Ave., Chattanooga, Tenn. Chemist, Dixie Mercerizing Company.

Kimbrell, Harvie Bruce—1809 Vance Ave., Chattanooga, Tenn. Assistant Chemist, Dixie Mercerizing Co.

McHugh, Daniel M.—47-31 59th Place, Woodside, L. I., N. Y. Colorist, Caledonia Print Works, 3rd and Clinton Sts., Hoboken, N. J.

Moran, Edward F.—19 Durant St., Lowell, Mass. Dye Chemist, Lawrence Mfg. Company.

Thomas, Charles W.—323 Cornell Ave., Swarthmore, Pa. Assistant Superintendent, Ewing Thomas Corp., Rose and Walnut Sts., Chester, Pa.

Wolfram, Norman J.—5 East Green St., Easthampton, Mass. Dyer, Hampton Co.

Student:

Alcott, Albert S., Jr.—59 Canton St., Lowell, Mass. Student, Lowell Textile Institute.

Daley, Charles L.—239 Stevens St., Lowell, Mass. Student, Lowell Textile Institute.

Dempsey, Phillip E.—Palmer Road, Monson, Mass. Student, Lowell Textile Institute, Lowell, Mass.

Hall, Robert Peyton—Mission Ridge, Chattanooga, Tenn. Student, Phila. Textile School, Philadelphia, Pa.

Kopatch, Chester M.—2 East St., Lawrence, Mass. Student, Lowell Textile Institute, Lowell, Mass.

Murphy, John J.—124 Liberty St., Lowell, Mass. Student, Lowell Textile Institute, Lowell, Mass.

Schoelzel, Herman W.—31 Milk St., Methuen, Mass. Student, Lowell Textile Institute, Lowell, Mass.

Shah, Shanti Hiralal—Chapsi Bldg., Princess St., Bombay. 2. India. Student, Lowell Textile Institute, Lowell, Mass.

Wyder, Robert, Jr.—Hawthorne, N. J. Student, Phila. Textile School, Philadelphia, Pa.

Young, Edmund Joseph, Jr.—545 School St., Lowell, Mass. Student, Lowell Textile Institute.

Associate:

Boesler, Arthur W.—3353 St. Vincent St., Philadelphia, Pa. Chemist, Laurel Soap Mfg. Co., Inc., 2600 E. Tioga St.

Brittain, James A.—722 South 27th Place, Birmingham, Ala. Salesman, E. F. Houghton & Co., 525 Rhodes-Haverty Bldg., Atlanta, Ga.

Jones, Arthur E., Jr.—2611 W. Allegheny Ave., Phila., Pa. Salesman, Alco Oil & Chemical Corp., Richmond and Shiller Sts.

Slade, George A.—425 Stetson St., Fall River, Mass. Salesman, Borden & Remington Co., 304 Canal St., Providence, R. I.

Stephens, A. H.—382 Morris Ave., Providence, R. I. Salesman, Proctor & Gamble Distributing Co., 69 Canal St., Boston, Mass.

Tiernan, Thomas M.—1117 East 11th St., Chattanooga, Tenn. Salesman, Walter A. Wood Supply Co.

Trezise, John E.—16 Gates Ave., Brooklyn, N. Y. Salesman, Onyx Oil & Chemical Company, Jersey City, N. J.

Corporate:

Corn Products Refining Company—17 Battery Place, New York, N. Y.

It was voted to reinstate James Worton who had been dropped for non-payment of dues last May.

It was also voted to hold the annual meeting in Chicago, Illinois, on September 8 and 9 of this year.

The result of the recent letter ballot was as follows:

409 votes..... "Yes"
11 votes..... "No"

The meeting adjourned at 2:30 P. M., to meet next in New York on April 28, 1933.

Respectfully submitted,

A. Newton Graves,
Secretary.

UNEMPLOYMENT REGISTER

For Members of the A.A.T.C.C.

At the last annual meeting it was suggested that the Association conduct an Unemployment Register for its members.

In accordance with this suggestion, members who are without employment at the present time should forward to the secretary a statement as to their qualifications and experience. This information will be placed on file and subsequently published in these pages. Identifying key numbers will be used so that each case may be brought most effectively to the attention of those persons likely to be in need of men of the stated qualifications.

Employers are also requested to file with the secretary any opportunities which are available in their businesses.

It is to be understood that this Unemployment Register is not (at the present time, at least) to be used for the benefit of those now employed and who are anxious to improve their conditions.

A. NEWTON GRAVES,
Secretary,
c/o Franklin Process Co.,
Providence, R. I.

CALENDAR OF COMING EVENTS

Meeting, New York Section, Paterson, N. J., May 26.

* * *

Meeting, Philadelphia Section, May 27th, Whitemarsh Valley C. C., Chestnut Hill, Philadelphia.

* * *

Special Meeting, South Central Section, May 26, University of Chattanooga. Regular Meeting, May 27.

* * *

Annual Meeting, Chicago, Sept. 8th and 9th.

AMERICAN
DYESTUFF
REPORTER

LOUIS A. OLNEY, Sc.D.
Professor of Chemistry and Dyeing, Lowell Textile Institute
Directing Editor

NORMAN A. JOHNSON
Managing Editor

MYRON DREW REESER
Advertising Manager

Published biweekly by
HOWES PUBLISHING CO., INC.
440 Fourth Avenue, New York City

A. P. HOWES
President

M. D. REESER
Secretary

H. F. CRAWFORD
Treasurer

Subscription price: $5.00 per year; Canadian $6.80; foreign $6.00

Vol. XXII May 22, 1933 No. 11

THE WORLD DYE TRADE IN 1932

"THE coal tar chemical industry is an essential component in the economic existence of the leading countries of the world. It is in the research field of coal tar chemistry that many of the most effective discoveries have been made in recent years affecting national health and safety. The dye group is most important among coal tar products, and too much emphasis cannot be placed upon national progress in this highly significant field. Development of research in the field of coal tar chemistry and the practical application of scientific knowledge in creating useful products from coal tar constitute two steps in the complete series of operations of which the third, and by no means the least important, is the marketing of the finished products."

The above is the opening paragraph of a report issued by the Department of Commerce and written by C. C. Concannon, Chief of the Chemical Division of the Bureau of Foreign and Domestic Commerce. According to this report world trade in coal tar dyes reacted unfavorably to the numerous disturbing factors which characterized the changed world conditions during the year, but in general maintained a slightly better position compared to many industries. It is of particular importance that, although there was general retrenchment throughout the dye industry, intensification of marketing effort was apparent and there was little abatement in the development of new dyes. The remarks of Mr. Concannon in regard to dye cartels will no doubt be of interest to our readers and they follow herewith.

"Due to the fact that the coal tar chemical industry holds such an important part in the economic existence of the countries of the world, great emphasis has been placed by different countries upon the establishment of individual self-sufficiency. The German I.G., the greatest business entity in Europe, frequently referred to as the German Dye Trust, derives its eminence and world-wide influence from its position in the dye field. The United States, though entirely dependent upon imports for dyes and completely under the dominance of Germany in this respect prior to the World War, has built up a domestic industry that to all intents and purposes is self-sufficient.

"The countries of Europe and Japan in the Orient have built up strong and flourishing coal tar chemical and dye industries. Because of factors peculiar to and inherent in dye business, the cartel movement has been particularly pronounced in this industry, the German Dye Cartel being one of the first cartels around which as a focal point exists today the International Dye Cartel, one of the most significant, from the point of view of the United States, of the great cartels of the world . . .

". . . The trend toward increased control and regulation which was evident in general industrial and commercial operations was noted among dye manufacturers and was also reflected in the extension of the European Dye Cartel.

"Although a number of countries showed material trade gains during the year, these were more than offset by widespread declines, the total trade being far below 1931 levels. Sales were affected chiefly by continued curtailment of operations in consuming industries during a major portion of the year, in addition to such items as currency depreciation in both producing and consuming countries, exchange restrictions, and generally unfavorable social and economic conditions."

In an article which we have run in a previous issue it was pointed out that general developments in the European Dye Cartel during 1932 included its expansion to cover in its present form the most important dye-producing groups in Germany, France, Switzerland, Spain, Italy, Great Britain and Poland. Referring back to the report of the Department of Commerce, it is brought out that

". . . The immediate effects of this furtherization of cartelization were reflected in the sharp rise in dye quotations of certain cartel members, readjustment of competition in a number of consuming markets, cooperation among member firms relative to the manufacture of certain lines of dyes, and also in a general change in company relations of the numerous dye producers comprising the world industry."

Although there were increases shown in the exports of France, Italy, Japan, and the Netherlands, this report indicates that these increases were overbalanced by the fact that world exports of dyes during 1932 were approximately $14,000,000 below the levels of 1931. In the table shown below which accompanies the report, the combined exports of the Cartel countries accounted for $49,981,725 of the total exports in 1932 which are listed. The other countries listed accounted for only $6,487,864 of which the United States is credited with $4,071,438. Two-thirds of the Cartel exports were supplied by Germany. It is explained that exports from Hong Kong, the Netherlands, Belgium, and Austria represent either wholly

or in major portion imported dyes and are not an index to production.

Exports

Country	1931 Pounds	1931 Value	1932 Pounds	1932 Value
Germany	96,389,840	$41,745,632	64,247,545	$31,735.225
Switzerland	18,512,026	13,803,547	13,994,269	11,039,740
United States	20,312,768	4,738,737	16,096,824	4,071,438
United King.	13,132,464	4,608,639	13,104,448	3,643,143
France	6,651,058	2,334,556	9,012,275	2,954,888
Netherlands	2,660,979	896,862	2,996,082	992,334
Hong Kong	1,636,524*	920,198	1,477,808*	656,263
Italy	1,695,134	542,221	2,285,973	598,950
Japan	4,470,561	248,871	10,047,181	428,016
Czechoslovakia	540,133	221,902	403,446	195,715
Belgium	638,899	203,434	351,196	123,437
Austria	57,981	28,040	33,731	20,661
Poland	102,515	44,688	22,046	8,720
Spain	27,662	9,695	9,127	1,059
Total	166,828,544*	$70,347,022	134,081,951*	$56,469,589

*Exclusive of aniline dyes exported from Hong Kong valued at $506,971 in 1931 and $288,574 in 1932, for which no quantity figures are available, but included in the value.

As far as imports are concerned, during 1932 they were considerably lower than 1931, but this is almost entirely accounted for by the sharp decreases in the requirements of the most important consuming markets. This fact is emphasized as it will be noted that 19 out of the 36 countries listed in the table below have registered increased imports, either on the basis of quantity or value.

Imports

Country	1931 Pounds	1931 Value	1932 Pounds	1932 Value
China	54,735,379[1]	$10,806,759	31,780,878[1]	$5,712,228
British India	17,561,434	7,870,185	16,145,227	5,344,379
United States	4,944,141	5,511,885	4,245,230	4,688,100
Czechoslovakia	7,822,003	3,460,038	6,637,015	3,610,223
United King.	6,164,032	5,755,006	4,670,624	3,382,387
Germany	6,554,783	3,651,948	6,831,413	3.344,950
Japan	4,439,561	3,557,626	4,390,823	2,548,576
France	2,533,331	2,609,697	2,222,479	2,313,512
Netherlands	5,266,843	2,601,674	4,318,856	2,118,045
Canada	3,154,176	1,836,560	3,378,372	1,982,530
Italy	2,942,289	2,651,577	2,112,469	1,914,378
Belgium	6,483,574	2,096,260	5,544,625	1,644,636
Switzerland	1,781,892	1,397,497	1,602,172	1,243,293
Austria	1,924,195	1,251,004	1,777,146	1,162,180
Netherland India	4,082,387	1,412,150	3,438,371	1,139,686
Sweden	3,080,973	[2]	3,259,899	[2]
Hungary	1,795,224	894,487	2,094,511	1,006,516
Hong Kong	2,445,255[3]	1,540,998	1,697,975[3]	967,119
Denmark	819,899	[2]	1,005,961	[2]
Austria	[2]	723,800	[2]	785,260
Norway	619,616	[2]	784,632	[2]
Poland	889,124	924,784	640,664	689,582
Bulgaria	837,757	512,279	831,143	551,135
Russia	4,355,311	628,780[4]	5,057,153	548,510[4]
Finland	592,647	492,514	692,226	410,968
Argentina	1,131,319	481,944	1,058,305	393,595
Latvia	1,807,790	339,600	1,979,751	308,600
Spain	607,003	407,212	538,922	268,778
Egypt	538,365	180,997	749,126	251,444
Greece	298,116	230,955	263,922	221,388
Estonia	162,988	120,295	218,919	190,406
Lithuania	1,050,723	104,610	1,067,478	183,580
New Zealand	[2]	140,000	[2]	149,728
Ireland	797,888	142,662	840,672	116,269
British Malaya	168,000	41,471	159,040	50,341
Ceylon	23,632	18,936	25,200	24,170

[1]Chinese imports are exclusive of "aniline dyes" valued at $3,447,235 in 1931 and $2,194,687 in 1932, for which no quantity figures are published. Value included in total figures given.

[2]Figures not published in official monthly statistics.

[3]Hong Kong quantity figures are exclusive of "aniline dyes" valued at $880,533 in 1931 and $485,706 in 1932, for which no quantity figures are available.

[4]Russian roubles converted at par value—$0.51455 United States currency.

The tables as published indicate to a great extent the comparative values of the dyestuff industries in the various countries. We are glad to note, that although the dyestuff industry has suffered along with other industries during the depression, there does not seem to be as much curtailment as in other branches.

New Patents

Abstracted by S. O. C. M. A.

Other patents will be found on page 350

Production of Nitrogenous Vat Dyestuffs of the Azine Series and the Products. (Yield on cotton green blue, very fast yellow green, extremely fast, blue black dyeings and dark blue shades of excellent fastness.) Max Albert Kunz, of Mannheim, and Karl Koeberle, of Ludwigshaften-on-the-Rhine, Ger., assignors to General Aniline Wks., Inc., of N. Y., N. Y., No. 1,888,631, Nov. 22, 1932.

Black Trisazo Dyestuffs and Their Production. (Dye cotton, wool, artificial silk, silk and mixed fabrics thereof deep greenish-black to bluish black shades which are completely fast to acid.) Achille Conzetti, of Basel, Switzerland, assignor to the firm: J. R. Geigy S.A., of Basel, Switzerland, No. 1,888,757, Nov. 22, 1932.

Manufacture of Mordant Azo Dyestuffs. (Comprises the oxidation of two amino groups of two molecules, to form a new azo group, give on chromium mordanted fibers fast, brownish-yellow tints.) Ernst Bodmer and Franz Neitzel, of Basel, Switzerland, assignors to the firm of Durand & Huguenin S.A., of Basel, Switzerland, No. 1,888,903, Nov. 22, 1932.

Vat Dyestuffs and Process of Preparing Them. (Obtainable by condensing a naphthoylene-aryl-imidazol-peri-dicarboxylic anhydride with an aromatic ortho-diamine; dye cotton fiber fast red to brown to grey tints.) Wilhelm Eckert and Otto Braunsdorf, of Frankfort-on-the-Main-Hochst, Ger., assignors to General Aniline Wks., Inc., of N. Y., N. Y., No. 1,889,279, Nov. 29, 1932.

Dye Composition. (Relates particularly to stable dry powder water-soluble compositions for household use in dyeing silk goods.) Louis Philippe, of N. Y., N. Y., No. 1,889,491, Nov. 29, 1932.

Copper Containing Disazodyestuffs. (Dye cotton and viscose silk blue to violet shades of good fastness properties.) Richard Stusser, of Cologne-Deutz, and Karl Wiedemann, of Cologne-Mulheim, Ger., assignors to General Aniline Wks., Inc., of N. Y., N. Y., No. 1,889,732, Nov. 29, 1932.

Thickening Materials for Textile Printing

(Continued from page 330)

thickening and the nature and the quantity of dry thickening constituting the film. The removal of the thickening takes place in the soaping machine, which is usually of the open type. The advantages of soaping printed goods in the full open are too obvious to mention. The open soaping machine is usually fitted with beaters partly immersed in the liquor and placed between each lap of the cloth. These beaters driven independently at high speed dash the liquor with great force upon both sides of the traveling cloth and they are supposed to thoroughly cleanse it by loosening and removing all thickening agents and extraneous matters. And they actually do a very good job if the film formed by the thickening is not too heavy and softens easily in the water. But, whenever this is not the case and the thickening is not all removed, then to obtain the required softness in the printed parts of the cloth it is necessary to treat the goods with a diastatic solution and afterwards to wash them again. Of course this entails two extra operations with consequent higher costs. Naturally in most cases it is highly objectionable. Gum tragacanth and well converted British gum and dextrines form films very soluble in water and easily washed out. So does gum arabic, gum shiraz and most of the natural gums. On the other hand starches and slightly converted British gums form films only slowly softened by water and consequently harder to wash out.

Choice of Thickenings

The choice of the particular thickening material to employ in a given case depends largely upon the following factors:

1. Quality, style and condition of the engraving.
2. Chemical properties of the dyestuffs, mordant, discharge or resist, as the case may be.
3. Degree of penetration required.
4. Surface of the cloth to be printed.
5. Finish to be put on the printed cloth.
6. Cost of production.

Engraving. Coarse and deep engraving requires ordinarily a more viscous paste to produce a similar impression to that obtained from delicate shallow engraving, but on heavy blotches the contrary holds true. A thick viscous color used for coarse, heavy blotches would in most cases display every line of the engraving, whereas a relatively thin color, both in viscosity and density, would spread out by capillary attraction and thus produce a more even ground. The best thickening for yielding even backgrounds is undoubtedly one made from a well converted British gum but only for use with pale shades. It cannot be used for dark shades because colors thickened with it wash out considerably on soaping with resultant poor color yield and danger of training other parts of the pattern and the white ground of the cloth. For dark shades a thickening made from starch and British gum, or its equivalent from a very slightly converted British gum, is more commonly employed, and if the engraving is in fine scale a thickening may be made with starch alone. When the engraving is coarse and starch alone is used it may require flattening or distributing by passing under an ungraved roller working in water or a thin starch paste and furnished with doctors as usual. For fine, sharp impressions the thickening must possess good fluidity and at the same time high density. Thickenings made from well converted British gums are the best. Gum tragacanth and diluted solutions of starch are very poor. For a crisp impression of stippled work and sharply defined shadows a thickening from starch or starch and tragacanth is best; for delicate gradations thin British gum solutions.

Dyestuff Chemical Properties Affecting Thickenings. An angle of this question which has not been investigated up to now, as far as I know, is the relation of the size and shape of the interstices between the molecular groupings or micellae in the gel structure of the thickening to the size and shape of the molecular or colloidal dispersion of the coloring matter. From what we know of the structure of gels in general and of carbohydrates pseudo-solutions in particular, it is safe to assume that the thickening film acts as a sieve or a net, and in consequence the size of the pores as related to the size of the molecular composition forming the color solution, is bound to have a very important bearing on color yield. This is clear to anyone who is familiar with the details of ultrafiltration through collodion films. No doubt to this must be related the fact that some dyestuff seems to be more adapted to a certain kind and concentration of thickening, independently of any other chemical reasons. It is known that the larger the molecular aggregations forming the micellae of the thickening the greater their capacity of absorbing and holding water and the larger and more abundant the interstices in the gel structure, permitting a free passage for the coloring matter even though of relatively large molecular structure to permeate to the fiber. This evidently occurs with thickenings made from gum tragacanth, locust bean gum and in less degree from thickenings made from unconverted starches. On the other hand it is logical to assume that whenever

the micellae, even if small, are closely packed together, the interstices will be smaller and while dyestuff and salts in true solution, or nearly so, will go through easily, dyestuff of large molecular dispersion will be retarded from reaching the fibers. And in practice we find that for mordants, discharges and resists, which are true salt solutions and for most of the direct, and basic dyes (other factors permitting) the best thickening to use is a well converted British gum or dextrine, gum arabic or senegal at fairly high concentration, while with vat and diazo colors the same thickenings yield only about half the depth of shade of a gum tragacanth or starch thickening.

Basic Dyes. In printing basic colors tannic acid is used to precipitate the base in an insoluble form on the vegetable fibers. In the absence of organic acids tannic acid precipitates most thickening materials. The starch precipitates are by far the most objectionable. Those with modified starches, British gums and dextrines, are less so in proportion to the degree of their solubility. British gums and dextrines, especially if made from tapioca and of 85 per cent. solubility or better, and natural gums such as arabic, senegal, shiraz and tragacanth, give very little precipitate and what little there is, is in a very fine state of division. Thickenings made from these materials give very good results. The action of tannic acid on starches, although not entirely prevented by organic acid, takes place very slowly in acid media. In this condition basic colors thickened with starch are fairly suitable for printing and may be used on blotches of darkest shades. In order to obtain good results the starch paste must contain about 10 per cent. of acetic acid and must be boiled long enough to be converted into some form of soluble starch or dextrine.

Alkaline Thickening for Indigo. For obvious reasons, starches and natural gums are unsuited for this purpose. The thickening should be made from a well converted British gum.

Vat Colors. The alkalinity of the printing pastes for these colors is much weaker than that of indigo colors. Potassium or sodium carbonate is used with them instead of caustic soda, and in consequence starches and natural gums can be employed to make the thickening. Well converted British gums, when used alone, give comparatively poor color yield, but when mixed with a good proportion of wheat or corn starch or tapioca flour, thickenings of varying viscosity and body can be obtained which give satisfactory results. Lately British gums and dextrines of slight solubility have been used along with these colors, but their advantage both as to color yield and rinsibility over mixtures of starch and highly soluble British gums, has to be as yet demonstrated. It is my opinion that the older method is not only less expensive, but offers to the colorist the opportunity of easily changing the viscosity and concentration of the thickening to meet his needs. The indanthrene colors are an exception to this rule when they are printed by the caustic soda method (without steaming) in which case a well converted British gum alone is best for thickening.

Diazo Colors. Prints on naphthol prepare. Most diazo solutions are liable to decompose at the ordinary temperature or when kept too long and, therefore, the thickening must be well cooled, if possible, near to the freezing point before mixing with the color, and kept in tinned or earthenware vessels standing in wooden tubs filled with ice. Another important feature of this type of color is that they are completely destroyed when reduced and the color does not consequently return on exposure to the air, as is the case with indigo and other vat dyes. Not all azo dyes are destroyed with the same facility in the presence of reducing agents, but just the same it is very important that in compounding a thickening for these colors all well converted gums and dextrines be eliminated as far as possible, as in the presence of caustic soda dextrose and other sugars produced in the hydrolyis of these materials act as powerful reducing agents. To thicken these colors, solutions of gum tragacanth alone, or mixed with starch paste, in different proportions to fit the engraving may be used. Very good results are obtained with mixtures of tapioca paste and locust bean gum paste. To prepare this thickening high grade tapioca flour is well boiled at 15 to 20 per cent. concentration and to this, when sufficiently cooled, is added a 4 or 5 per cent. locust bean paste previously well boiled and cooled. For blotches and heavy patterns embodying large masses of color, use one part of locust bean paste and one part of tapioca paste; for spots, stripes and checks more tapioca and less locust bean paste.

Rapid Fast Colors. These colors consist of stable diazo compounds of various bases in combination with naphthol A. S. Their application is very simple, as no prepare on the cloth is necessary and they are printed with the same type of thickening as the regular diazo colors. After printing, drying and steaming as required, they have to be developed in a suitable bath.

Rapidogens. These colors are the latest development of the diazo series. Not only do they not require any preparation of the cloth, but they are developed by steaming only. They are soluble only in fairly strong caustic soda solutions, and like the other colors of this type, are destroyed by reducing agents. For this reason they present quite a problem in the preparation of a proper thickening. The alkaline thickenings used for vats and sulphur colors are unsatisfactory as they mostly consist of well converted British gums and dextrines, high in reducing matter. These thickenings, when used with rapidogens, as is to be expected, give a very poor color yield. Aside from the question of reducing matter, high concentration of solids in the thickening seems to be especially objectionable with these colors. On the other hand, gum tragacanth alone, or unconverted starch pastes alone when mixed with strong caustic soda solutions become unsuitable for good printing. Mixtures of gum tragacanth and starch work much better as far as printing quality and stability of the paste is concerned, but due to the large content of starch, they are objectionable when maximum rinsibility is required. Recently some gums or

mixtures of gums made from specially treated starches have come into the market and have been used with good results. They are free from reducing matter; they can be used at fairly high concentrations—10 to 20 per cent. for sharp definition—they remain stable when mixed with strong caustic soda solution; and their rinsibility is superior to that of starch, or tragacanth and starch mixtures.

Indigosols. These are sulfonated derivatives of indigo and analogous compounds from the various substitution products of indigo: The introduction of these colors is a revolution in the application of vat dyestuffs. They are very soluble in water and stable in air, their applications very simple, and the absence of alkalis in the printing color obviates many inconveniences. Thickenings made from plain starch, or mixtures of starch and gum tragacanth, and especially thickenings made with slightly converted starch gums to fit the requirements of the engraving, give very good results.

Degree of Penetration. When the color is required to penetrate to the back of the cloth, beside increasing the pressure of the bowl against the roller, the thickening must be not only thin, but its solid content must be low. Other factors permitting, gum tragacanth, tapioca flour, wheat starch, corn starch in the order named, and used as thin as possible, are to be chosen. Highly concentrated pastes of starches, especially corn, which has the property of quickly congealing, and British gum solutions of high concentration even if thin, give only partial penetration and leave the color more on the surface of the cloth.

Surface of the Cloth. The degree of penetration of any color and the changes to be made in the type of thickening thereof, are greatly influenced by the surface of the cloth. Hard twisted yarn in the weft or in the warp, or in both, the bleached or unbleached state of the goods, the degree and quality of bleaching, mercerization, etc., all must be taken in consideration in choosing the proper thickening. It woud take too long at this time to discuss these points one by one, and I suppose that every printer is familiar with this matter. No less important than these points is the question of the finish which has to be put on the printed goods. If they are required to possess a soft feel, the thickening of the printing color must be capable of being entirely removed without subjecting the goods to a treatment of such severity as to injure the colors. Cost of treatment also must be taken into consideration. In other words, the thickening must be easily soluble. I refer here to what I said previously about rinsibility.

These remarks must not be taken as constituting hard and fast rules for the application of particular thickening materials, but rather as indicating in a slight degree some of the purposes to which they are particularly adapted.

Cost. It often happens that the print price of goods is too low to allow of their being treated in the best way, and in such cases the first thing that comes in mind is to cut down the cost of the thickening. At this moment, I want to bring to your attention that the original cost of the materials which enter in the compounding of the thickening is not the only thing to be taken into consideration when the final cost of the printing operation is determined. It very often happens that materials that cost more are cheaper in the end, either because they yield a better color value, or because they require much less time and work in washing and rinsing out.

Conclusion. Some printers seem to have a fixed idea that they ought to be able to handle all their work with one type of thickening. From what I have said today I hope I have demonstrated to you that this idea should be discarded. The printer who makes full use of his knowledge of the chemical properties of the different dyestuffs and thickening materials and who employs good judgment in choosing those best adapted to the work in hand, can not only save money for his concern but also contribute greatly to its reputation for producing fine quality prints.

New Sandoz Dyes

The Sandoz Chemical Works has issued circulars on the following new dyes:

Chloramine Purple 10*BC*—an addition to their range of Direct Red Dyestuffs, said to be distinguished by its fastness to acids and resistance to the action of copper and chrome. It is claimed to be suitable for the dyeing of all varieties of cotton material as well as viscose and cuprammonium rayon. It is said to be dischargeable to a pure white with hydrosulfite and leaves acetate white.

Alizarine Light Brown BL—a new homogeneous brown said to possess extremely high light fastness and may be employed either as an acid or a chrome color. It is recommended by the manufacturer for the production of light to medium shades on slubbing and loose wool where a high standard of fastness, particularly to light, is required.

Omega Flavine CLG—a new greenish chrome yellow said to possess good fastness to light, carbonizing and good solubility. This color is recommended by the manufacturer as a shading product in the dyeing of slubbing, for piece goods and yarn.

Chloramine Fast Brown 3*B*—As a result of many laboratory tests, it is claimed that this color has been found to dye cotton and viscose a more uniform shade than any other brown in this class of colors. It is said to dye uneven viscose and ordinary cotton particularly level and in addition a decided affinity for "dead" cotton. It is particularly recommended by the manufacturer for the dyeing of hosiery.

Some Observations on the Quantitative Description of

The Dyeing Properties of Direct Cotton Colors*

By S. M. NEALE

DURING the last twelve months the author and his colleagues have been engaged in an attempt to study in an exactly quantitative way the absorption of direct dyestuffs by cellulose. This work is at the time of writing in a stage of development which does not lend itself to adequate summarizing, and in this communication only a few of the more salient aspects will be described. A full account of the technique employed, and a study of the kinetics of the absorption of Sky Blue FF on viscose sheet, have been submitted for publication elsewhere.

Effect of Time of Dyeing and of Added Sodium Chloride

Certain general principles have arisen out of this work on Sky Blue FF, and have been found applicable to the behavior of other dyestuffs. It has been found that the presence of a foreign electrolyte, such as sodium chloride, is essential for the absorption of an appreciable amount of the color. The absorption reaches a real equilibrium after a certain lapse of time, and the amount absorbed at equilibrium increases continuously with the concentration of the added salt. The time required to reach equilibrium, however, is great at low salt concentrations, and as more salt is added decreases to a minimum and finally rises again when the salt concentration exceeds about 10 g. per liter. The separate effects on the final absorption and on the time required for half saturation are shown in Fig. 1 for the three direct dyestuffs, Sky Blue FF, Benzopurpurine 4B, and Chrysophenine G. The time for half saturation refers to a viscose sheet weighing 5.7 mg. per sq. cm.

It has been found possible to explain the results obtained for the increase of dye absorption with the time in terms of the mathematical theory of diffusion. It is assumed that the outside of the sheet is dyed immediately on immersion, the color then diffusing towards the center at a rate proportionate to its gradient of concentration in the cellulose phase. In agreement with this hypothesis it is found that a cellulose sheet of half the usual thickness dyes to a given fraction of saturation in one quarter of the time. The analysis of a dyed sheet by scraping showed that at equilibrium the distribution of dye across the section is almost uniform. For sheet material of a given thickness, the time for half saturation is a measure of the apparent diffusion coefficient, the two quantities being in fact inversely proportional.

Comparison of Different Dyestuffs

Some data obtained at 100° for the dyestuffs so far examined are given in Fig. 2. In some cases these results are to be regarded as tentative and may be revised when more accurate figures are available. In the diagram the time for half saturation of the viscose sheet 0.004 cm. thick is plotted against the absorption at saturation, the salt concentration at each point being given in small figures. It will be observed that in each case the saturation absorption increases steadily with the amount of added salt, while the time for half saturation falls to a minimum and then rises. On comparing one dyestuff with another, it will be seen that there is a close correlation between the amount of the absorption and the time required for half saturation; indeed at high salt concentrations the points lie on or near a straight line passing through the origin, indicating direct proportionality between absorption and time required. The possible significance of this will be discussed later.

The relative positions of the dyestuffs on the diagram correspond with technical experience, Sky Blue FF and Benzopurpurine 4B being dyes of high affinity and poor levelling power, while Chrysophenine G and Fast Red K show dyeing properties at the other extreme.

Effect of Temperature

Contrary to the usual technical belief, we have found that all the dyes examined are similarly affected by change of temperature. In each case the saturation or equilibrium absorption increases by about 4% per 1° temperature fall, while the time required for half saturation is roughly doubled by a drop of 10° in the temperature. The variation of absorption with the temperature indicates a heat of absorption probably of the order of several thousand small calories per gram-molecule. The prevalent idea that different dyes are affected in different directions by temperature change arises from the fact that technical dyeings are not usually carried to equilibrium. The result is that in some cases—the slow-dyeing dyestuffs like Sky Blue FF—the effect of temperature on the time factor pre-

*Jour. Soc. Chem. Ind.

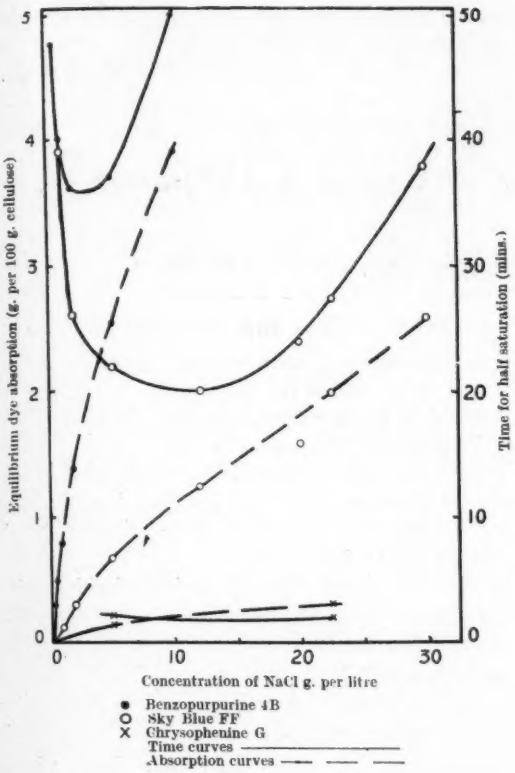


FIG. 1

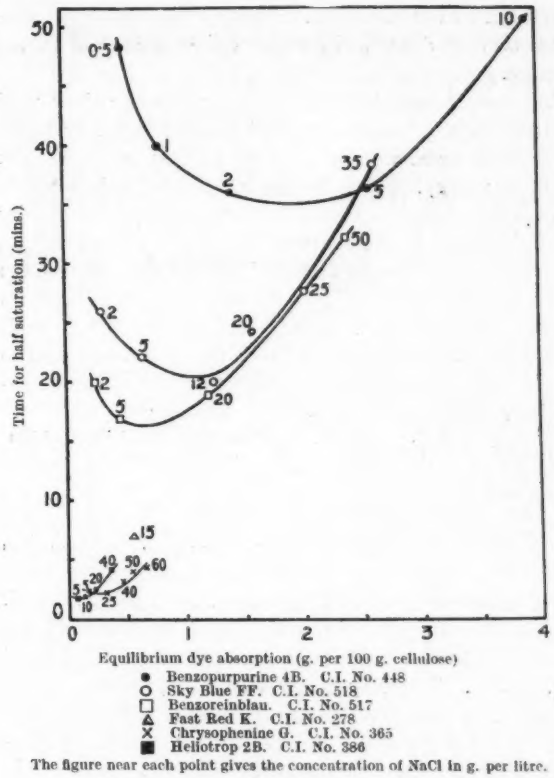

Time for half saturation (mins.)
Equilibrium dye absorption (g. per 100 g. cellulose)
Benzopurpurine 4B. C.I. No. 448
Sky Blue FF. C.I. No. 518
Benzoreinblau. C.I. No. 517
Fast Red K. C.I. No. 278
Chrysophenine G. C.I. No. 365
Heliotrop 2B. C.I. No. 386
The figure near each point gives the concentration of NaCl in g. per litre.

FIG. 2

Absorption of dyestuffs by sheet cellulose at 100°

dominates and the shade of dyeing increases with rising temperature, while in others—the rapid-dyeing dyestuffs like Chrysophenine G—approximately equilibrium dyeings are obtained and the absorption is found to decrease with rising temperature.

The above figures illustrate the magnitude of the temperature effect.

Absorption of Dyestuffs from Solutions Containing 0.05 g. Per Liter by Viscose Sheet

Dyestuff	NaCl, g. per liter	Temp.	G. dye per 100 g. cellulose at saturation	Minutes for half saturation
Sky Blue FF...	5	100°	0.73	23
	5	90°	1.0	43
	2	25°	3.2	16,000
Heliotrope 2B..	5	90°	0.12	3.3
(Bayer)	5	60°	0.37	11
Chrysophenine G	25	100°	0.44	1.9
	2	25°	1.00	230
Fast Red K....	15	90°	0.76	10
	8	25°	2.5	770

Theoretical Aspects of This Work

The great effect exerted by added sodium chloride and by other electrolytes might perhaps be interpreted as indicating that only neutral dye salt Na_nR or Na^+ ions and R^- ions in close association, and not dyestuff anions R^-, can be absorbed by cellulose. The effect of the added salt might be ascribed to a throwing back of the ionization of the dyestuff. An explanation on "colloid" lines in terms of tendency to coagulation would be difficult to sustain, as we have found aluminium sulfate no more effective an assistant than sodium chloride.

The variation of the apparent diffusion coefficient and conversely of the time for half-saturation with the salt concentration is twofold—it first increases and then decreases. For the increase we offer no explanation at the moment. The decrease on the other hand may be regarded as a necessary consequence of the increasing absorption. Higher absorption, whether resulting from addition of salt above 5 g, per liter, change of dyestuff, or falling temperature, always results in decreased diffusion rate, *i.e.*, in increased time for half saturation.

This inverse correlation between absorption and diffusion—which breaks down at low salt concentrations—is easily understood if the process be regarded as one of diffusion of dyestuff molecules through intermicellar water channels and of their adsorption on the micellar surfaces.*

The rate of diffusion of all dyestuffs down the water channels might then at a given temperature be of the same order of magnitude. A consideration of the diffusion equation shows, however, that if adsorption on micellar surfaces took place, the apparent diffusion coefficient would be a fraction $1/A$ of the true diffusion

*It is unlikely that there is in wet cellulose a sharp transition from unswollen micelles to water spaces, but a precise separation is assumed in the above discussion to simplify the issue (see Trans. Faraday Soc., 1933, *29*, 232).

coefficient in water, where A is the ratio of absorbed dyestuff to free dyestuff in water channels normal to the surface.

We have found that the particular cellulose sheet used in these experiments increases in surface area by about 20% in water at any temperature (100 g. take up about 60 g. of water). Since the dye concentration in water is always 0.05 g. per liter in our experiments, and the density of dry cellulose is 1.5, the total free dye in water channels normal to the surface in 100 g. of the cellulose immersed in water will be $(100/1.5) \times (20/100) \times (0.05/1000) = 0.0007$ g. at saturation. The ratio A absorbed/free dye is then $D/0.0007$, D being the saturation dye absorption in g. per 100 g. of cellulose. The estimated diffusion coefficients in the water spaces then become:

Dyestuff	NaCl, g. per liter	Temp.	Dye absorbed, %	Apparent diffusion coefficient In wet cellulose	In water spaces
Sky Blue FF	25	100°	2.0	11×10^{-8}	3.3×10^{-4}
Benzopurpurine 4B	10	100°	3.9	6×10^{-8}	3.5×10^{-4}
Heliotrope 2B	40	90°	0.51	41×10^{-8}	3.1×10^{-4}
Fast Red K	15	90°	0.76	28×10^{-8}	3.2×10^{-4}
	8	25°	2.52	0.39×10^{-8}	0.15×10^{-4}

Robinson and Hartley (Proc. Roy. Soc., 1931, *A, 134,* 20) have found for several direct cotton dyestuffs in pure water a diffusion coefficient of the order 3×10^{-4} cm./min. at 25°. The very rough values deduced above for temperatures near the boiling point are of this order, but at 25° a much lower diffusion coefficient results. Robinson and Hartley point out that the diffusion coefficient is greatly reduced in presence of sodium chloride.

The idea of diffusion in intermicellar water channels, however, is highly conjectural and is by no means free from difficulties. The width of such channels is probably of the order of several Angström units only, so that dye molecules may proceed by a shuffling process in a semi-absorbed condition. Whatever the mechanism of the diffusion, however, our results indicate a definite inverse correlation between intensity of adsorption and diffusion rate.

It is realized that the present communication is a rather inadequate and premature attempt to summarize a large mass of new information, and the various aspects of this work will be fully discussed in subsequent papers.

The author is indebted to his colleagues Miss M. Corner, Messrs. W. L. Garvie, W. A. Griffiths, J. Hanson, A. M. Patel, and W. A. Stringfellow, whose cooperation has made this work possible.

College of Technology,
Manchester

TEXTILE COLOR CARD ASS'N NEWS

Annual Meeting

At the 18th annual business meeting of the Textile Color Card Association, held on April 12th at the headquarters of the Association, 200 Madison Avenue, New York City, all directors were re-elected, as follows:

Charles Pinnell, president, Fred Butterfield & Co.
Roy E. Tilles, 1st vice-president, Gotham Silk Hosiery Co.
Armand Schwab, 2nd vice-president, Amberg, Schwab & Co.
Alfred L. Simon, treasurer, Alfred L. Simon & Co.
W. Robert Blum, United Piece Dye Works.
Albert L. Gifford, Worumbo Company.
William Hand, John Hand & Sons.
Edward S. Johnson, James G. Johnson & Co.
J. Laird Schober, Laird Schober & Co.

Margaret Hayden Rorke was re-elected secretary and managing director.

1933 Fall Shoe and Leather Colors

Three high style and six classic staple colors for women's shoes have ben adopted for fall by the Allied Shoe and Leather Industries in cooperation with the Textile Color Card Association. Margaret Hayden Rorke, managing director of the color organization, stated that advance swatches of the new shades had just been issued to members of the Textile Color Card Association in the shoe and leather industries.

The following are designated as high fashion colors:

Brown Taupe—a subtle blending of grey and brown, representing a very significant tone in the dark taupe family; especially smart because of its harmonizing qualities with the high fashion costume shades of the same range and with new light browns in fall fabrics.

Gungrey—new deep grey of the taupe family; important as a dark neutral to complement a wide range of costume greys for fall.

Burbon—already a highly successful color for men's shoes, this swagger type of shade is emphasized in this new adaptation, because of the increased style interest for the man-tailored theme in women's apparel.

1933 Fall Woolen Colors

Thirty-six new woolen shades, the first of the fall color collections to be presented by the Textile Color Card Association, have just been sent to all members in advance swatch form, it was announced recently.

The issuance of these confidential swatches to the entire membership marks a broader service on the part of the Association. Originally reserved for the woolen industry, so many members in other branches of the trade wished to secure these swatches, that it was decided to issue them to all members.

Now that the attention of industry is being focused on fall production, Mrs. Rorke stated, these woolen shades are the advance indication of basic color trends for the coming season. They will influence related industries and will be reflected in the silk, millinery and other color collections for fall to be launched shortly by the Association, thus effecting a trade-wide coordination. The issuance of these advance swatches likewise makes possible a better color understanding between manufacturers and retailers when determining the outstanding shades that will prevail in fall merchandise.

Technical Notes From Foreign Sources

Points to Be Observed in Boiling of Finishing Pastes

C. H. Fischer—Kunst-Seide 14, 52 (1932).—A three-page article, containing more closely-packed information than is easily to be found in anything except reference works. The sections, to give an idea of the scope and nature of the paper, are headed—

a—What vessels and apparatus are needed for preparation of finishing pastes?

b—Why must the vessels be absolutely clean?

c—What must be done to the finishing agent before it is boiled?

d—Why should the paste be boiled?

e—How do pastes with incorrect properties form?

f—What is the consequence of using pastes incorrectly prepared?

g—What is the cause of lumps, crusts, dirty and film-like formations within the paste?

h—Through what is the luster of artificial silk affected?

i—How is dusting off during weaving caused?

j—How can aqueous pastes be kept stable?

k—One last word concerning the souring of pastes.

There are, perhaps, no new facts at all cited under any of these headings—all points are those which are already perfectly well known. Yet such a concise and complete—and brief yet full—resume as the present one has a distinct value in recalling some important point, known but temporarily forgotten in the hurry of work. It is highly creditable to a technical journal to include such articles as this, in company with more elaborate and purely scientific papers.

Defects in Artificial Silk Goods

"Efhak"—Kunst-Seide 14, 56 (1932).—Thanks to the enormous expansion of the artificial silk industry during recent years, the use of the most varied sorts of goods made of that material has increased to an extent never before met with along any line of manufacture. In general, it may be said that the artificial material has shown itself thoroughly valuable for the most varied uses. But here and there it appears that some improvement in either the material or in its mode of working up is necessary, if the artificial fiber is to work its way uniformly into all of its possible fields of usefulness. We hear from time to time, from the piece-goods seller, that a consumer was not satisfied with all of the different articles purchased, and has gone back to articles of cotton, linen, or natural silk, according to the nature of the article. Thus, table-covers, etc., of artificial silk, for the coffee- or tea-table, which the trade spoke highly of at first, have not made their way as rapidly as was expected. More than one intending purchaser is repelled by the directions for washing, included generally with such articles—i.e., the table-covers should not be rubbed during the washing, the memorandum generally runs. Now, in practical usage, even with the best of intentions, it must happen now and then that a fruit or wine spot, or something similar, gotten upon the fabric, cannot be removed, without the rubbing, so safe and effective in the case of cotton or linen. The housewife really has a right to expect that table-cloths, napkins, runners, etc., shall be able to endure the ordinary treatment in washing, without special precautions having to be taken for special materials, and that they shall all come out of the wash both clean and undamaged. Special treatment of artificial silk goods in the household always involves certain inconveniences which the housewife would gladly avoid; and so she prefers to use cotton or linen articles, as long as these special precautions necessary in washing artificial silk are valid. Other causes for dissatisfaction are offered by artificial silk Tricots, which are accused of stretching locally in washing, so that the garments do not fit or hang well thereafter. This difficulty, serious enough with certain kinds of underwear, is not so particularly serious in some other types of garments.

It would seem advisable, in the interest of further extension of the artificial silk industry, for the artificial fiber producer to look carefully into these and other difficulties, and to devise ways of overcoming them.

We often hear of women avoiding the use of artificial silk for underclothing, because such articles have to be pressed after each occasion of wear, because of the creases and wrinkles produced by wearing. This difficulty can be overcome simply, by choice of a different kind of fiber for such good. E.g., Air Silk withstands knitting well, is specially adapted for the manufacture of wearing apparel, and particularly for neckties (perhaps the most exacting type of clothing in this connection), since the fiber, after bending or folding, springs back naturally into its original shape when the stress is removed, and so wrinkling or creasing does not take place.

Cellulose Acetate in Sheets

Fritz Ohl—Kunst-Seide 14, 146 (1932).—With the rapidly increasing appreciation of the usefulness of viscose silk in transparent sheets—"Cellophane"—it is not at all surprising that successful efforts have been made to produce the same kind of material with cellulose acetate as a base. Such material is already upon the market under the name Ultraphane, Acetophane, etc. The price of this material is higher than that of Cellophane, and in addition the material possesses certain specific properties which, together with the high price, prevent its use as an alternative to Cellophane in a general way. But for use

in the tropics the acetate material will stand up under trying conditions where Cellophane will not.

Such transparent sheets of cellulose acetate have, of course, been in wide use for some years past, in the form of the substratum for photographic roll and cut film, for both professional and amateur use. For some years, the common substratum for amateur roll and amateur cine film has consisted of cellulose acetate—"Safety Film," so-called—but since a well-known disaster of not more than two years ago in the middle west, when a number of deaths by inhalation of the fumes from burning nitrocellulose film (the occasion was a fire in a hospital, where few were burned, but a considerable number who inhaled the fumes of burning photographic X-ray films died within a few days) even the cut film and cine film used professionally are being made more and more with cellulose acetate as the substratum. But the present discussion has regard to acetate film in thin and very flexible sheets for wrapping purposes, as a parallel to Cellophane.

As in the case of Cellophane, the acetate film can be manufactured by either the wet or dry process, and by either the endless band or the cylinder process. Acetone-soluble cellulose acetate must obviously be used, for the sake of rapid removal of the solvent by volatilization, which is brought about by a combination of heat and air circulation.

Every point of importance in the manufacture of acetate fiber—the quality of the cellulose material employed, the solvents, additions, etc., are equally valid in the production of the transparent sheets, with one exception; while, for the spinning of fibers, acetone is the most suitable solvent, in the case of sheet-production, cheaper solvents, such as, e.g., ethyl acetate mixed with alcohol, may be successfully used. Higher-boiling solvents cause difficulty, not only in completeness of removal, but also by imparting certain undesirable properties to the finished product. The recovery of the volatile solvents is as important as in the manufacture of the fiber, and is of greater difficulty, because of the frequently more extended dimensions of the stratum of acetate from which this solvent must be withdrawn.

Softening-agents are still more important in film-manufacture than in fiber production, since the sheet-material is to be subjected to more severe and deliberate folding, creasing, etc., in use. Triphenyl phosphate, tricresyl phosphate, etc., are most useful as softeners. The amount needed is about 20-30% (is this reckoned upon the volume of solution, or upon the final solid basis?).

The machinery required is much more compact and takes up less space than is the case with the manufacture of Cellophane.

The apparatus for the band process consists of an endless belt of sheet copper, from 14 (former length) to 30 meters (present length), and commonly 60 cm. wide. It runs upon two cast-iron rollers, carefully trued, the one of which, at the beginning of the apparatus, is driven mechanically, the other playing free and moving by tension of the band. The second roller is carefully adjustable by set-screws to produce desired and perfectly even tension of the copper band. The band is carefully polished on the outer surface, the joint, however produced, being carefully trued off; and the surface is frequently silver-plated and the plating polished. The band, receiving a continuous deposit of the cellulose acetate solution at the beginning of the course of the upper half, travels continuously and slowly through a drying tunnel through which warm (70°-80° C.), filtered air passes, either directly or in counter-current. The most modern form of pouring device consists of a V-shaped trough, whose front plate, as to its lower edge, functions as an adjustable scraper, a "doctor-blade," by which the initial depth of the actate coating, and so the thickness of the final film, can be controlled. The other plate of the trough is also adjustable, so that the slit through which the solution passes can be narrowed or widened, in relation to the height of the doctor-blade. The trough as a whole is also adjustable within 0-3 mm. of distance from the surface of the copper band. Some troughs provide also a drainage chamber to take care of any solution scraped off by the doctor-blade.

Any unevenness of surface on the band will of course be reproduced on the finished sheet. The copper band is therefore coated with a substratum, of gelatine-glycerol, Sichel glue, cellulose derivatives of more than 10 C-atoms, etc., which substratum is dried upon the band, and then forms a firm, glistening, absolutely smooth surface. Such a substratum, however, has to be replaced about once every month.

The speed at which the band travels varies. For thin sheets, for wraping purposes, the speed may be 30 meters per hour; for "movie" film, which is about 0.13 mm. in thickness, 18-20 meters per hour; for still thicker films, perhaps only 10 meters.

As the film leaves the band at the second roller, it is drawn off and rolled up upon wooden rollers. It still contains residual solvent, so that, before going upon the storage roller, it must usually pass over polished, heated cylinders, similar to those used in paper machines. Instead of this "calendering," some makers pass the endless sheet through a special drying tunnel, in which the film is passed and repassed over polished neated rollers until it comes out perfectly dry, ready to be rolled up for temporary storage.

The cylinder process simply replaces the endless band by a large rotating cylinder, polished or coated as in the case of the band, and similarily inclosed, except that obviously the inclosure is only a casing instead of a long tunnel; the cylinder is generally steam-heated from within. The cylinder may make about 55-60 revolutions per hour, and at this speed may produce about 50,000 meters of thin sheet, with an available width of 50 cm., per day.

For the wet process, the process itself and the apparatus are much like those of the Cellophone industry. Conditions are about the same as for cellulose acetate fiber spinning. In order to avoid getting a cloudy or milky, instead of a transparent, film, the sheet must pass through

the precipitating bath under a certain tension. The problem of recovery of the evaporated solvent is as serious as in the production of the fiber. Beside the absorption-method, depending upon the use of animal charcoal, or m-cresol, simple condensation is also possible, principally by means of strong cooling. While some vapor of the solvent does escape condensation, yet by utilizing the only partly-scrubbed air again, i.e., passing it back from the scrubber into the drying tunnel or chamber instead of fresh air, one avoids loss of the uncondensed solvent, and also avoids the problem of providing large quantities of what may be called unused air; i.e., the continuous provision of fresh air, which will have to be carefully scrubbed to remove dust, is made unnecessary.

There is great danger of some parts of the machinery becoming electrically charged, thus emitting sparks within, from metal to metal, with consequent ignition of the explosive mixture of solvent vapor and air. This danger is avoided by careful grounding of all metal parts, and by discharging the sheets by causing them to pass beneath grounded discharging combs, of the type familiar to those who remember the now old-fashioned static-electric generators of the Holtz and Toepler types.

The whole subject is, even now, in the experimental stage. The product, however, has already proved its value, and the only real problem now existent is that of lowering the costs of production.

Cupro- and Viscose Silks—Their Differentiation

Dr. A. Zart—Kunst-Seide 14,150 (1932).—From time to time, different methods have been published for distinguishing between cupro and viscose-silks—the nature of cross-section of fiber, aspect in ultra-violet light, dyeing tests. The latter method depends upon the well-known fact that the relation of the two fibers to the dyestuff chosen will be very different; cupro-silk takes up direct dyestuffs much more rapidly than does viscose, while the latter fiber is more rapidly and strongly taken up by the basic dyestuffs. Such dyestuffs as shown this distinction most strongly have, of course, been specially recommended for the purpose.

Now, if the distinction depends upon the relative degree of absorption, or upon a slight alteration in degree, the differentiation is only comparative, not absolute. The use of a mixture of dyestuffs which are very different in tone is much better. Such a mixture was first proposed by Hoelkeskamps, for distinguishing between the two kinds of fiber, and has been officially recommended by the "RAL" as a standard method. This mixture consists of a "Pelikan" ink and Eosine, and dyes cupro-silk blue, and viscose-silk pink. Criticism from several sources has pointed out that, with a commercial ink, we have no assurance that its composition will always remain the same, and that, in case of an unannounced change in the composition, the test may easily fail, with consequent incorrectness of diagnosis of the type of fiber.

It is not a difficult matter to prepare other mixtures which are not open to this criticism. If we use the dyestuffs Sirius Blue B and Eosine, solutions of 2 g. each per liter, and for use mix equal parts of the two stock solutions, and dye the sample under investigation for 10 minutes at 18°-20° C., then rinse well, the wet as well as the dry sample will show a sharply characteristic color; the cupro-silk will be dyed deep violet-blue, the viscose silk strong pink.

Of course, all such color tests (which includes also the diphenylamine-sulphuric acid test for nitro-silk) must be carried out upon undyed samples. For dyed material, only a study of the cross-section of the fiber will be of use; and, with the modern developments in spinning, even this is no longer always decisive.

Vat Dyestuff Intermediates

German Patent No. 453,997 (27-XII-'27)—*I. G. Farben-Ind. A. G.*—The products are dihalogenated dibenzpyrenequinones. Up to the present, such products have been obtained by direct halogenation of the parent substance, dibenzpyrenequinone, and as the position of the halogen atoms has not been decisively determined, it has not been possible to assume whether one was dealing in different cases with the same or with another compound. The present method consists in treating 1-5-dibenzoyl-2-6-dihydroxynaphthalene with a halogenide of phosphorus, which in one operation closes the ring to the pydenequinone, and also replaces the hydroxyl groups by halogen. As the location of the groups in the original naphthalene is known, the constitution of the product is deducible in a certain manner.

Stable Diazo Preparations (or Diazotizable Preparations)

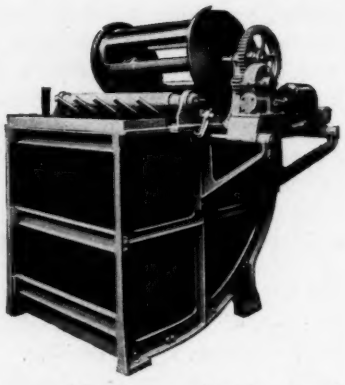
German Patent No. 448,728 (26-VIII-'27) — *I. G. Farben-Ind. A. G.*—Compare the preceding. The present patent specifies the use of partly dehydrated aluminium sulfate or alum. Five examples are given. The preceding patent it a development of the present one.

Migasol PJ

The Society of Chemical Industry in Basle has introduced a new auxiliary textile product under the above name, which is especially recommended by the manufacturers for the production of water-repellant finishes on textile fabrics. Migasol PJ represents the impregnating material in its simplest form, and a solution of it in water serves, without any further additions, for the impregnation of cotton, linen, viscose, Bemberg art silk, acetate silks, natural silks, weighted silks, wool and half-wool fabrics.

Migasol PJ is said to have a great advantage over all other impregnating mediums, which must be assisted by the addition of Aluminum Acetate, in its simple and safe application. The impregnating bath contains 10-20 g. per liter of Migasol PJ. The operation of Migasol PJ is illustrated by a number of practical recipes. This product is described in Circular No. 377, distributed by the Ciba Company.

Haveg Machine Shown by Butterworth



A 4-string piece dyeing machine for wool and worsted fabrics, made of Haveg, the acid and corrosion-resistant material, attracted a lot of interest at the Knitting Arts Exhibition in Philadelphia.

This machine is the first Haveg textile machine made in this country.

The tub of the machine was 36 inches wide, and was equipped with winch and idler reel, motor-driven. The tub was cradled in cast iron frame, which also provided mounting for the drive. The tub was fitted inside with a perforated Haveg boiling wall and Haveg steam distribution pipes.

Also exhibited were buckets, dippers, and sections of piping made of Haveg.

To those requesting it, a sample piece of Haveg was presented.

New Patents

(*Abstracted by Synth. Org. Chem. Mfrs. Ass'n.*)

Preparation of Vat Dyestuff Isomers of the 1.4.5.8 *Naphthoylene Dibenzimidazol Series and the Product.* (Relates to a process of separating the dyestuff mixtures obtainable according to U. S. Patent No. 1,588,451 into their two components; dye orange and bluish red tints of excellent fastness.) Wilhelm Eckert and Heinrich Greune, of Frankfort-on-the-Main-Hochst, and Willy Eichholz, of Mannheim, Ger., assignors to General Aniline Wks., Inc., of N. Y., N. Y., No. 1,888,624, Nov. 22, 1932.

New Vat Dyestuff Isomers. (Relates to a process of separating the dyestuff mixtures obtainable according to U.S.P. 1,588,451 into their two components; see above Patent No. 1,888,624.) Wilhelm Eckert and Otto Braunsdorf, of Frankfort-on-the-Main-Hochst, Ger., assignors to General Aniline Wks., Inc., of N. Y., N. Y., No. 1,888,625, Nov. 22, 1932.

Separation of New Vat Dyestuff Isomers. (Relates to a process of separating the dyestuff mixtures obtainable according to U. S. Patent 1,588,451, into their two components. See above two Patents Nos. 1,888,624; 1,888,625.) Wilhelm Eckert and Otto Braunsdorf, of Frankfort-on-the-Main-Hochst, Ger., assignors to General Aniline Wks., Inc., of N. Y., N. Y., No. 1,888,626, Nov. 22, 1932.

CLASSIFIED

The rate for "Position Wanted" advertisements in this column is 2 cents a word—with a minimum of 50 cents per insertion. For all other types of advertisements—i.e., help wanted, machinery or supplies for sale—the rate is $5.00 per column inch or less per insertion.

Turn those odd lots of dyestuff into cash. Opportunity to liquidate your surplus stock of dyes. Let me know what you have on hand and I will put you in contact with a buyer on a 10% commission basis. Inquiries for job lots also solicited—Charles J. Rupp, (formerly of Kalle-Newport-DuPont), 420 State St., Brooklyn, N. Y.

POSITION WANTED—Cotton and Rayon Piece Dyer. Twenty-five years' practical experience in processing and dyeing. Capable of taking charge of any dye-house and producing results. Had charge of two large dye-houses. References first class. Will go anywhere. Address Box No. 776, American Dyestuff Reporter, 440 Fourth Ave., New York, N. Y.

TEXTILE SCHOOL GRADUATE—Eleven years' experience in both practical and laboratory printing and dyeing of cotton, rayon, wool and acetate silk; also dyestuff experience both laboratory and sales. Executive ability. Desires new connection. Address Box No. 777, American Dyestuff Reporter, 440 Fourth Ave., New York, N. Y.

CELANESE AND RAYON DYER desires position. Is thoroughly experienced in every phase of the work on piece goods. Can handle boil-off. Address Box No. 778, American Dyestuff Reporter, 440 Fourth Ave., New York, N. Y.

TEXTILE CHEMIST AND ANALYST—Graduate of Lowell Textile Institute, desires position in mill laboratory or with chemical concern catering to the textile trade. Two years' experience in the laboratory of one of the leading textile manufacturers. Can supply best of references. Address Box No. 779, American Dyestuff Reporter, 440 Fourth Ave., New York, N. Y.

WANTED—Expert hosiery dyer on both paddle and rotary type machines. Box No. 780, American Dyestuff Reporter, 440 Fourth Ave., New York, N. Y.